H1-5 (4-6 min)

1		2		3	
(1)	0	(1)	9	(1)	4
(2)	-6	(2)	27	(2)	4
(3)	-17	(3)	25	(3)	-4
(4)	1	(4)	-27	(4)	-4
(5)	11	(5)	-25	(5)	1
(6)	13	(6)	25	(6)	27
(7)	17	(7)	-27	(7)	$-\frac{1}{27}$
(8)	3	(8)	27	(8)	$\frac{1}{24}$
(9)	$-\frac{1}{4}$	(9)	-25	(9)	16
(10)	$\frac{1}{2}$	(10)	16	(10)	32
(11)	-3	(11)	16	(11)	1
(12)	3	(12)	-16	(12)	$\frac{2}{3}$
(13)	24	(13)	4	(13)	$\frac{2}{3}$
(14)	$-\frac{3}{5}$	(14)	$-\frac{1}{3}$	(14)	-9
		(15)	-48	(15)	-16
		(16)	1	(16)	$\frac{1}{9}$

4		5	
(1)	-34	(1)	$7a$
(2)	-10	(2)	$3a$
(3)	21	(3)	$-a$
(4)	-7	(4)	0
(5)	-14	(5)	$2x-3$
(6)	1	(6)	$a+4b$
(7)	-3	(7)	$-\frac{1}{6}x$
(8)	0	(8)	$\frac{5}{6}a-\frac{1}{3}b$
(9)	$-\frac{13}{24}$	(9)	$\frac{5}{2}ab$
(10)	$\frac{3}{5}$	(10)	$4x^2+x-1$
(11)	$-\frac{1}{15}$	(11)	$\frac{7}{6}a^2+\frac{5}{12}a$
(12)	$-\frac{1}{2}$	(12)	$4a+2b$
(13)	$-\frac{31}{40}$	(13)	$-4x-12$
		(14)	$7a-5b$
		(15)	$-\frac{2}{3}x-\frac{5}{4}y$
		(16)	$-15y$

10 (4–6 min)

6	7	8
(1) $\boxed{6}x - \boxed{2}$	(1) $10a - 20b$	(1) $\frac{x+16}{4}$
(2) $-x + 2y + 2$	(2) $-2x + 4y$	(2) $\frac{9x+8y}{12}$
(3) $-y$	(3) $-15x + 5y - 10$	(3) $\frac{3x+y}{6}$
(4) $4x + 5$	(4) $x + 2$	(4) $-\frac{7}{12}$
(5) -3	(5) $8x - 11$	(5) $\frac{19x+7}{18}$
(6) -7	(6) $2x + 30$	
(7) $4x + 8$	(7) $-8y$	
(8) $-4b - 8$		

6	7	8	
(9) $2x + 4y + 3$	(8) 2	(6) $\frac{x-13}{6}$	
(10) $-a - 5c$	(9) $\frac{2}{3}a - \frac{1}{3}b$	(7) $\frac{3}{4}$	
(11) $16y - 4$	(10) $4a - 2b$		
(12) $5a - 4b$	(11) $9a + 10$	(8) $\frac{-8x+17}{12}$	Alternative Answer $\left(-\frac{8x-17}{12}\right)$
(13) $2x + y$	(12) $x + 4$		
(14) $6a - 5b - 8$	(13) $-\frac{1}{2}a - \frac{2}{3}b$	(9) $\frac{-2x-11}{6}$	$\left(-\frac{2x+11}{6}\right)$
(15) $3b + 3$	(14) $x + 4$	(10) $\frac{11x+3}{20}$	
(16) $-4a + 3c$			

9		10	
(1) $\frac{x-5}{6}$		(1) $7x - 13$	
(2) $\frac{2x-11}{6}$		(2) $4x - 5$	
(3) $\frac{x-2}{3}$		(3) $11x + 5$	
(4) $\frac{-19x-18}{15}$	$\left(-\frac{19x+18}{15}\right)$	(4) $7x + 16$	
(5) $\frac{x-y}{3}$		(5) $13x - 16y$	

9		10	
(6) $\frac{-2x-3}{9}$	$\left(-\frac{2x+3}{9}\right)$	(6) $\frac{9x+2}{6}$	
(7) $\frac{x-1}{2}$		(7) $\frac{-2x+3y}{15}$	$\left(-\frac{2x-3y}{15}\right)$
(8) $\frac{-x+5}{4}$	$\left(-\frac{x-5}{4}\right)$	(8) $\frac{-22x+12}{15}$	$\left(-\frac{22x-12}{15}\right)$
(9) $\frac{-7x+10y}{9}$	$\left(-\frac{7x-10y}{9}\right)$	(9) $5x + 35$	
(10) $\frac{-x+5}{3}$	$\left(-\frac{x-5}{3}\right)$	(10) $-2x - 15y$	

H11–14 (4–6 min)

11

1.

(1) -5

(2) 13

(3) -11

(4) -3

(5) -1

(6) -9

(7) 3

(8) 9

(9) 18

(10) -9

12

1.

(1) -6

(2) -19

(3) 14

(4) -5

(5) 0

(6) -1

(7) -1

(8) -7

11

2.

(1) 2

(2) 10

(3) 2

(4) 2

(5) $\frac{1}{12}$

(6) 2

(7) $\frac{1}{4}$

(8) $-\frac{1}{4}$

(9) $-\frac{1}{2}$

12

2.

(1) $\frac{1}{6}$

(2) $-\frac{5}{6}$

(3) 0

(4) 10

(5) $\frac{1}{2}$

(6) $-\frac{2}{3}$

(7) $\frac{9}{10}$

(8) $-\frac{2}{3}$

13

(1) $x=-2$

(Verification)

$(-2)\quad -11$

$(-2)\quad -11$

(2) $x=1$

(Verification)

LHS = 3

RHS = 3

(5) $x=4$

(Verification)

$\text{LHS}=\frac{10}{3}$

$\text{RHS}=\frac{10}{3}$

(6) $x=-4$

(Verification)

$\text{LHS}=-\frac{11}{6}$

$\text{RHS}=-\frac{11}{6}$

14

(1) $x=\frac{9}{2}$

(Verification)

LHS = −24

RHS = −24

(2) $x=1$

(Verification)

LHS = −6

RHS = −6

(5) $x=8$

(6) $x=3$

(7) $x=-20$

(8) $x=\frac{11}{7}$

13

(3) $x=\frac{1}{2}$

(Verification)

LHS = −3

RHS = −3

(4) $x=\frac{7}{4}$

(Verification)

LHS = 4

RHS = 4

(7) $x=18$

(Verification)

LHS = 5

RHS = 5

14

(3) $x=2$

(Verification)

LHS = 0

RHS = 0

(4) $x=\frac{3}{4}$

(Verification)

$\text{LHS}=-\frac{7}{4}$

$\text{RHS}=-\frac{7}{4}$

H15-20 (4-6 min)

15	16	17
(1) $x=10$	(1) $x=-12$	(1) $x=9$
(2) $x=20$	(2) $x=12$	(2) $x=2$
(3) $x=-3$	(3) $x=7$	(3) $x=-\frac{3}{5}$
(4) $x=2$	(4) $x=2$	(4) $x=0$
(5) $x=\frac{2}{3}$		
15	**16**	**17**
(6) $x=-\frac{5}{2}$	(5) $x=0$	(5) $x=-24$
(7) $x=7$		
(8) $x=2$	(6) $x=-8$	(6) $x=-\frac{1}{24}$
(9) $x=0$		
(10) $x=\frac{9}{4}$	(7) $x=2$	(7) $x=2$

18	19	20
(1) 3 1 / 3 5 / $x=\frac{5}{3}$	(1) $x=1$	(1) $x=9$
(2) $x=-19$	(2) $x=-16$	(2) $x=17$
(3) 3 / 3 9 / 7 7 / $x=1$	(3) $y=-5$	(3) $x=1$
(4) $x=4$	(4) $y=16$	(4) $x=\frac{5}{2}$
18	**19**	**20**
(5) $x=-12$	(5) $x=16$	(5) $y=\frac{6}{5}$
(6) $x=\frac{1}{12}$	(6) $x=23$	(6) $y=2$
(7) $x=4$	(7) $y=10$	(7) $t=-11$

H21–24 (5–8 min)

21a

Ex.

(1) $\begin{cases} 7x+2y=20 & \cdots ① \\ 5x+2y=16 & \cdots ② \end{cases}$

[Sol]

①−②

$$\begin{array}{rrl} & 7x+2y & =20 \\ -) & 5x+2y & =16 \\ \hline & 2x & =4 \\ & & x=2 \end{array}$$

Substituting $x=2$ into ①,

$14+2y=20$

$2y=6$

$y=3$

$\begin{cases} x=2 \\ y=3 \end{cases}$

(Verification)

Substituting $x=2$ and $y=3$ into ① and ②,

① LHS $=7x+2y=7\times 2+2\times 3=20$, RHS $=20$

② LHS $=5x+2y=5\times 2+2\times 3=16$, RHS $=16$

21b

(2) $\begin{cases} x=3 \\ y=2 \end{cases}$

(Verification)

Substituting $x=3$ and $y=2$ into ① and ②,

① LHS $=8\times 3+3\times 2=30$, RHS $=30$

② LHS $=5\times 3+3\times 2=21$, RHS $=21$

(3) $\begin{cases} x=2 \\ y=-1 \end{cases}$

(Verification)

Substituting $x=2$ and $y=-1$ into ① and ②,

① LHS $=9\times 2+2\times(-1)=16$, RHS $=16$

② LHS $=5\times 2+2\times(-1)=8$, RHS $=8$

22

(1) 2, 2, 4, 9, 3 $\begin{cases} x=2 \\ y=3 \end{cases}$

(2) $\begin{cases} x=3 \\ y=-2 \end{cases}$

(3) $\begin{cases} x=-1 \\ y=2 \end{cases}$

(4) $\begin{cases} x=1 \\ y=2 \end{cases}$

(5) $\begin{cases} x=1 \\ y=2 \end{cases}$

(6) 3, 3, 3 $\begin{cases} x=2 \\ y=3 \end{cases}$

(7) $\begin{cases} x=1 \\ y=-2 \end{cases}$

(8) $\begin{cases} x=8 \\ y=3 \end{cases}$

23

(1) 4 $\begin{cases} x=4 \\ y=3 \end{cases}$

(2) $\begin{cases} x=3 \\ y=-2 \end{cases}$

(3) $\begin{cases} x=2 \\ y=1 \end{cases}$

(4) $\begin{cases} x=1 \\ y=-2 \end{cases}$

(5) $\begin{cases} x=2 \\ y=1 \end{cases}$

(6) $\begin{cases} x=-1 \\ y=2 \end{cases}$

(7) $\begin{cases} x=-2 \\ y=1 \end{cases}$

(8) $\begin{cases} x=1 \\ y=-2 \end{cases}$

24

Ex.

(1) $\begin{cases} x=2 \\ y=1 \end{cases}$

(2) $\begin{cases} x=2 \\ y=3 \end{cases}$

(3) $\begin{cases} x=2 \\ y=1 \end{cases}$

(4) $\begin{cases} x=-2 \\ y=1 \end{cases}$

(5) $\begin{cases} x=-3 \\ y=2 \end{cases}$

(6) $\begin{cases} x=-2 \\ y=3 \end{cases}$

(7) $\begin{cases} x=2 \\ y=0 \end{cases}$

25

(1) $\boxed{2}$
$\begin{cases} x=10 \\ y=-12 \end{cases}$

(2) $\begin{cases} x=-2 \\ y=6 \end{cases}$

(3) $\begin{cases} x=4 \\ y=3 \end{cases}$

(4) $\begin{cases} x=4 \\ y=-3 \end{cases}$

(5) $\begin{cases} x=2 \\ y=3 \end{cases}$

(6) $\begin{cases} x=-3 \\ y=2 \end{cases}$

(7) $\begin{cases} x=3 \\ y=1 \end{cases}$

(8) $\begin{cases} x=2 \\ y=4 \end{cases}$

26

(1) $\begin{cases} x=3 \\ y=1 \end{cases}$

(2) $\begin{cases} x=1 \\ y=-2 \end{cases}$

(3) $\begin{cases} x=-3 \\ y=4 \end{cases}$

(4) $\begin{cases} x=-2 \\ y=-3 \end{cases}$

(5) $\begin{cases} x=-1 \\ y=2 \end{cases}$

(6) $\begin{cases} x=-1 \\ y=-2 \end{cases}$

(7) $\begin{cases} x=2 \\ y=1 \end{cases}$

(8) $\begin{cases} x=-3 \\ y=-2 \end{cases}$

27

(1) $\begin{cases} a=2 \\ b=-5 \end{cases}$

(2) $\begin{cases} a=1 \\ b=-2 \end{cases}$

(3) $\begin{cases} a=3 \\ b=1 \end{cases}$

(4) $\begin{cases} a=2 \\ b=1 \end{cases}$

(5) $\begin{cases} a=4 \\ b=-2 \end{cases}$

(6) $\begin{cases} a=2 \\ b=3 \end{cases}$

(7) $\begin{cases} a=3 \\ b=-2 \end{cases}$

(8) $\begin{cases} a=-4 \\ b=3 \end{cases}$

28

(1) $\begin{cases} x=2 \\ y=\frac{1}{2} \end{cases}$

(2) $\begin{cases} x=5 \\ y=4 \end{cases}$

(3) $\begin{cases} x=1 \\ y=2 \end{cases}$

(4) $\begin{cases} x=1 \\ y=\frac{1}{3} \end{cases}$

(5) $\begin{cases} x=2 \\ y=1 \end{cases}$

(6) $\begin{cases} x=1 \\ y=-2 \end{cases}$

(7) $\begin{cases} x=2 \\ y=1 \end{cases}$

(8) $\begin{cases} x=2 \\ y=\frac{1}{3} \end{cases}$

29

(1) $\begin{cases} x=7 \\ y=-3 \end{cases}$

(2) $\begin{cases} x=11 \\ y=-3 \end{cases}$

(3) $\begin{cases} x=\frac{5}{2} \\ y=2 \end{cases}$

(4) $\begin{cases} x=-4 \\ y=3 \end{cases}$

(5) $\begin{cases} x=12 \\ y=-4 \end{cases}$

(6) $\begin{cases} x=3 \\ y=-2 \end{cases}$

(7) $\begin{cases} x=-7 \\ y=6 \end{cases}$

(8) $\begin{cases} x=\frac{1}{2} \\ y=\frac{1}{3} \end{cases}$

30

(1) $\begin{cases} x=-2 \\ y=3 \end{cases}$

(2) $\begin{cases} x=-2 \\ y=3 \end{cases}$

(3) $\begin{cases} x=-2 \\ y=3 \end{cases}$

(4) $\begin{cases} x=-2 \\ y=3 \end{cases}$

(5) $\begin{cases} a=2 \\ b=-3 \end{cases}$

(6) $\begin{cases} a=2 \\ b=-\frac{1}{3} \end{cases}$

Consider this!

H31–35 (5–8 min)

31

Ex.

(1) $\begin{cases} x=2 \\ y=3 \end{cases}$

(Verification)

Substituting $x=2$ and $y=3$ into ① and ②,

① $\begin{cases} \text{LHS}=2\times2+3=7 \\ \text{RHS}=7 \end{cases}$

② $\begin{cases} \text{LHS}=7\times2+2\times3=20 \\ \text{RHS}=20 \end{cases}$

(2) $\begin{cases} x=2 \\ y=1 \end{cases}$

(3) $\begin{cases} x=2 \\ y=1 \end{cases}$

(4) $\begin{cases} x=3 \\ y=2 \end{cases}$

(5) $\begin{cases} x=1 \\ y=3 \end{cases}$

32

(1) $6x+2y$ | 10 | $5x$ | 15

$\begin{cases} x=3 \\ y=-4 \end{cases}$

(2) $\begin{cases} x=2 \\ y=-3 \end{cases}$

(3) $\begin{cases} x=1 \\ y=-3 \end{cases}$

(4) $\begin{cases} x=1 \\ y=3 \end{cases}$

(5) $\begin{cases} x=4 \\ y=-3 \end{cases}$

(6) $\begin{cases} x=3 \\ y=7 \end{cases}$

(7) $\begin{cases} x=5 \\ y=3 \end{cases}$

(8) $\begin{cases} x=3 \\ y=1 \end{cases}$

33

(1) $\begin{cases} x=1 \\ y=2 \end{cases}$

(2) $\begin{cases} x=3 \\ y=-4 \end{cases}$

(3) $\begin{cases} x=2 \\ y=1 \end{cases}$

(4) $\begin{cases} x=2 \\ y=1 \end{cases}$

(5) $\begin{cases} x=2 \\ y=1 \end{cases}$

(6) $\begin{cases} x=3 \\ y=2 \end{cases}$

(7) $\begin{cases} x=1 \\ y=2 \end{cases}$

(8) $\begin{cases} x=1 \\ y=2 \end{cases}$

H31–35

34

(1) $\begin{cases} x=3 \\ y=2 \end{cases}$

(2) $\begin{cases} x=1 \\ y=-3 \end{cases}$

(3) $\begin{cases} x=2 \\ y=3 \end{cases}$

(4) $\begin{cases} x=-3 \\ y=2 \end{cases}$

(5) $\begin{cases} x=2 \\ y=-4 \end{cases}$

(6) $\begin{cases} x=-4 \\ y=-2 \end{cases}$

(7) $\begin{cases} x=6 \\ y=5 \end{cases}$

35

Ex.

(1) $\begin{cases} x=-2 \\ y=5 \end{cases}$

(2) $\begin{cases} x=3 \\ y=2 \end{cases}$

(3) $\begin{cases} x=-1 \\ y=3 \end{cases}$

(4) $\begin{cases} x=2 \\ y=3 \end{cases}$

(5) $\begin{cases} x=-3 \\ y=8 \end{cases}$

(6) $\begin{cases} x=4 \\ y=2 \end{cases}$

(7) $\begin{cases} x=4 \\ y=-2 \end{cases}$

H36–40 (5–8 min)

36	37	38
(1) $\begin{cases} x=3 \\ y=-1 \end{cases}$	(1) $\begin{cases} x=4 \\ y=6 \end{cases}$	(1) $\begin{cases} x=3 \\ y=4 \end{cases}$
(2) $\begin{cases} x=1 \\ y=2 \end{cases}$	(2) $\begin{cases} x=2 \\ y=-3 \end{cases}$	(2) $\begin{cases} x=6 \\ y=10 \end{cases}$
(3) $\begin{cases} x=3 \\ y=-4 \end{cases}$	(3) $\begin{cases} x=-1 \\ y=2 \end{cases}$	(3) $\begin{cases} x=2 \\ y=0 \end{cases}$
(4) $\begin{cases} x=-1 \\ y=4 \end{cases}$	(4) $\begin{cases} x=-4 \\ y=-3 \end{cases}$	(4) $\begin{cases} x=0 \\ y=\frac{3}{7} \end{cases}$
(5) $\begin{cases} x=2 \\ y=3 \end{cases}$	(5) $\begin{cases} x=1 \\ y=2 \end{cases}$	(5) $\begin{cases} x=6 \\ y=-2 \end{cases}$
(6) $\begin{cases} x=2 \\ y=-1 \end{cases}$	(6) $\begin{cases} x=-2 \\ y=3 \end{cases}$	(6) $\begin{cases} x=1100 \\ y=1900 \end{cases}$
(7) $\begin{cases} x=3 \\ y=-2 \end{cases}$	(7) $\begin{cases} x=8 \\ y=6 \end{cases}$	(7) $\begin{cases} x=2 \\ y=3 \end{cases}$

39	40
(1) $\begin{cases} x=7 \\ y=9 \end{cases}$	(1) $\begin{cases} x=3 \\ y=2 \end{cases}$
(2) $\begin{cases} x=6 \\ y=-10 \end{cases}$	(2) $\begin{cases} x=-2 \\ y=3 \end{cases}$
(3) $\begin{cases} x=2 \\ y=0 \end{cases}$	(3) $\begin{cases} x=2 \\ y=-4 \end{cases}$
(4) $\begin{cases} x=3 \\ y=-4 \end{cases}$	(4) $\begin{cases} x=-8 \\ y=-16 \end{cases}$
(5) $\begin{cases} x=6 \\ y=2 \end{cases}$	(5) $\begin{cases} x=6 \\ y=-3 \end{cases}$
(6) $\begin{cases} x=-1100 \\ y=1900 \end{cases}$	(6) $\begin{cases} x=2 \\ y=-3 \end{cases}$
(7) $\begin{cases} x=0 \\ y=0 \end{cases}$	(7) $\begin{cases} x=3 \\ y=-2 \end{cases}$

H41–45 (5–8 min)

41

Ex.

(1) $\begin{cases} x=-3 \\ y=8 \end{cases}$

(2) $\begin{cases} x=3 \\ y=5 \end{cases}$

(3) $\begin{cases} x=-2 \\ y=3 \end{cases}$

(4) $\begin{cases} x=-6 \\ y=-4 \end{cases}$

(5) $\begin{cases} x=4 \\ y=-3 \end{cases}$

(6) $\begin{cases} x=4 \\ y=5 \end{cases}$

42

(1) $\boxed{2}$ $\boxed{5}$ $\begin{cases} x=1 \\ y=-2 \end{cases}$

(2) $\begin{cases} x=4 \\ y=5 \end{cases}$

(3) $\begin{cases} x=1 \\ y=-2 \end{cases}$

(4) $\begin{cases} x=2 \\ y=6 \end{cases}$

(5) $\begin{cases} x=-4 \\ y=5 \end{cases}$

(6) $\begin{cases} x=1 \\ y=2 \end{cases}$

43

(1) $\begin{cases} x=6 \\ y=-2 \end{cases}$

(2) $\begin{cases} x=5 \\ y=-13 \end{cases}$

(3) $\begin{cases} x=-3 \\ y=-5 \end{cases}$

(4) $\begin{cases} x=7 \\ y=-3 \end{cases}$

(5) $\begin{cases} x=2 \\ y=\frac{1}{2} \end{cases}$

(6) $\begin{cases} x=\frac{3}{2} \\ y=-\frac{1}{2} \end{cases}$

H41–45

44

Ex.

(1) $\begin{cases} x=5 \\ y=2 \end{cases}$

(2) $\begin{cases} x=4 \\ y=-3 \end{cases}$

(3) $\begin{cases} x=8 \\ y=2 \end{cases}$

*Students can solve without rewriting decimals into integers.

45

(1) $\begin{cases} x=\frac{1}{5} \\ y=\frac{1}{2} \end{cases}$

(2) $\begin{cases} x=\frac{1}{10} \\ y=\frac{1}{2} \end{cases}$

(3) $\begin{cases} x=\frac{3}{5} \\ y=\frac{1}{4} \end{cases}$

(4) $\begin{cases} x=\frac{1}{2} \\ y=-\frac{2}{5} \end{cases}$

30 (5–8 min)

46	47	48
(1) $\begin{cases} x=1 \\ y=-1 \end{cases}$	(1) $\begin{cases} x=-3 \\ y=4 \end{cases}$	OK (1) $\begin{cases} x=5 \\ y=-2 \end{cases}$
(2) $\begin{cases} x=4 \\ y=1 \end{cases}$	(2) $\begin{cases} x=5 \\ y=6 \end{cases}$	
(3) $\begin{cases} x=4 \\ y=2 \end{cases}$	(3) $\begin{cases} x=4 \\ y=3 \end{cases}$	
(4) $\begin{cases} x=1 \\ y=3 \end{cases}$		

46	47	48
(5) $\begin{cases} x=6 \\ y=-18 \end{cases}$	(4) $\begin{cases} x=-3 \\ y=-6 \end{cases}$	(2) $\begin{cases} x=4 \\ y=1 \end{cases}$
(6) $\begin{cases} x=7 \\ y=-4 \end{cases}$	(5) $\begin{cases} x=-1 \\ y=3 \end{cases}$	(3) $\begin{cases} x=4 \\ y=-9 \end{cases}$
(7) $\begin{cases} x=6 \\ y=7 \end{cases}$		(4) $\begin{cases} x=3 \\ y=-2 \end{cases}$

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older

H46–50

49	50
(1) $\begin{cases} x=1 \\ y=2 \end{cases}$	(1) $\begin{cases} x=6 \\ y=3 \end{cases}$
(2) $\begin{cases} x=1 \\ y=-2 \end{cases}$	(2) $\begin{cases} x=3 \\ y=-2 \end{cases}$
(3) $\begin{cases} x=5 \\ y=24 \end{cases}$	(3) $\begin{cases} x=3 \\ y=4 \end{cases}$
	(4) $\begin{cases} x=-\frac{5}{3} \\ y=\frac{8}{3} \end{cases}$

49	50
(4) $\begin{cases} x=6 \\ y=2 \end{cases}$	(5) $\begin{cases} x=3 \\ y=4 \end{cases}$
(5) $\begin{cases} x=2 \\ y=1 \end{cases}$	Consider this!

51

Ex.

(1) $\begin{cases} x = -2 \\ y = -4 \end{cases}$

(Verification)

Substituting $x = -2$ and $y = -4$ into ① and ②,

① $\begin{cases} \text{LHS} = \dfrac{-2-1}{3} = -1 \\ \text{RHS} = \dfrac{-4}{4} = -1 \end{cases}$

② $\begin{cases} \text{LHS} = \dfrac{-2}{2} = -1 \\ \text{RHS} = -4+3 = -1 \end{cases}$

(1) $\begin{cases} x = 9 \\ y = 12 \end{cases}$

(2) $\begin{cases} x = -8 \\ y = -9 \end{cases}$

52

(1) $\begin{cases} x = \dfrac{23}{2} \\ y = 5 \end{cases}$

(2) $\begin{cases} x = -5 \\ y = -4 \end{cases}$

(1) $\begin{cases} x = \dfrac{23}{2} \\ y = -5 \end{cases}$

(2) $\begin{cases} x = 5 \\ y = -4 \end{cases}$

53

(1) $\begin{cases} x = 5 \\ y = 2 \end{cases}$

(2) $\begin{cases} x = 3 \\ y = 7 \end{cases}$

(1) $\begin{cases} x = -3 \\ y = -3 \end{cases}$

(2) $\begin{cases} x = 3 \\ y = 2 \end{cases}$

54

(1) $\begin{cases} x = -12 \\ y = -30 \end{cases}$

(2) $\begin{cases} x = 4 \\ y = 8 \end{cases}$

(1) $\begin{cases} x = -4 \\ y = 2 \end{cases}$

(2) $\begin{cases} x = -2 \\ y = 4 \end{cases}$

55

(1) $\begin{cases} x = 4 \\ y = 6 \end{cases}$

(2) $\begin{cases} x = -1 \\ y = -3 \end{cases}$

(3) $\begin{cases} x = 8 \\ y = 6 \end{cases}$

(4) $\begin{cases} x = 4 \\ y = 2 \end{cases}$

H56–60 (5–8 min)

56

1 $\begin{cases} x = \frac{5}{7} \\ y = \frac{11}{7} \end{cases}$

2 $\begin{cases} x = 4 \\ y = -3 \end{cases}$

3) $\begin{cases} x = -1 \\ y = 1 \end{cases}$

4 $\begin{cases} x = -4 \\ y = 2 \end{cases}$

57

1 $\begin{cases} x = 3 \\ y = 2 \end{cases}$

2) $\begin{cases} x = -3 \\ y = 6 \end{cases}$

3 $\begin{cases} x = \frac{1}{2} \\ y = \frac{1}{2} \end{cases}$

4 $\begin{cases} x = 4 \\ y = 2 \end{cases}$

58

1 $x = -1$
$y = -2$

2 $\begin{cases} x = 2 \\ y = -\frac{1}{2} \end{cases}$

3 $\begin{cases} x = \frac{1}{2} \\ y = -\frac{1}{2} \end{cases}$

4 $\begin{cases} x = 4 \\ y = -\end{cases}$

o dest (short n the sc
leade challenging curriculum topics, and specialis

59

1 $\begin{cases} x = 2 \\ y = -\frac{1}{2} \end{cases}$

2 $\begin{cases} x = 7 \\ y = 3 \end{cases}$

3) 1
11
$\begin{cases} x = 2 \\ y = 1 \end{cases}$

4) $\begin{cases} x = 2 \\ y = 3 \end{cases}$

60

1 $\begin{cases} x = 8 \\ y = -6 \end{cases}$

2 $\begin{cases} x = -14 \\ y = -12 \end{cases}$

3 $\begin{cases} x = -6 \\ y = -9 \end{cases}$

4 $\begin{cases} x = 7 \\ y = -3 \end{cases}$

61

Ex.

(1)

[Sol]

Substituting ① into ②,

$5x-(3x-1)$?

$\begin{cases} x=3 \\ y=8 \end{cases}$

(Verification)

Substituting $x=3$ and $y=8$ into ① and ②,

ㄱ) LHS = 8, RHS = $3\times3-1=8$

ㄴ) LHS = $5\times3-8=7$, RHS = 7

(2) $\begin{cases} x=3 \\ y=7 \end{cases}$

(3) $\begin{cases} x=-1 \\ y=2 \end{cases}$

(4) $\begin{cases} x=4 \\ y=3 \end{cases}$

(5) $\begin{cases} x=2 \\ y=-2 \end{cases}$

62

(1) $\begin{cases} x=3 \\ y=-6 \end{cases}$

2 $\begin{cases} x=-3 \\ y=3 \end{cases}$

(3) $\begin{cases} x=4 \\ y=-6 \end{cases}$

(4) $\begin{cases} x=1 \\ y=-5 \end{cases}$

5 $\begin{cases} x=-1 \\ y=2 \end{cases}$

(6) $\begin{cases} x=4 \\ y=4 \end{cases}$

7) $\begin{cases} x=3 \\ y=9 \end{cases}$

8 $\begin{cases} x=4 \\ y=-3 \end{cases}$

63

1 $\begin{cases} x=2 \\ y=-3 \end{cases}$

$\begin{cases} x=-2 \\ y=6 \end{cases}$

$\begin{cases} x=3 \\ y=-2 \end{cases}$

4 $\begin{cases} x=2 \\ y=2 \end{cases}$

5 $\begin{cases} x=2 \\ y=6 \end{cases}$

6 $\begin{cases} x=-1 \\ y=2 \end{cases}$

$\begin{cases} x=2 \\ y=-1 \end{cases}$

8 2

3

Grade 6 is a great year at [illegible]
oldest cohort in the school, there are many opportunities and
eadership roles, fun and challenging curriculum topics and

64

1 $\begin{cases} x=3 \\ y=-2 \end{cases}$

2 $\begin{cases} x=-2 \\ y=-1 \end{cases}$

$\begin{cases} x=-7 \\ y=-11 \end{cases}$

4 $\begin{cases} x=5 \\ y=2 \end{cases}$

5 $\begin{cases} x=-4 \\ y=5 \end{cases}$

6 $\begin{cases} x=-2 \\ y=-2 \end{cases}$

7 $\begin{cases} x=-3 \\ y=2 \end{cases}$

65

1 $\begin{cases} x=3 \\ y=1 \end{cases}$

2 $\begin{cases} x=-2 \\ y=4 \end{cases}$

3 $\begin{cases} x=-2 \\ y=-4 \end{cases}$

4 $\begin{cases} x=6 \\ y=5 \end{cases}$

*Check if students solve the equations using the substitution method.

7

7

$\begin{cases} x=2 \\ y=1 \end{cases}$

5) $\begin{cases} x=4 \\ y=-2 \end{cases}$

66

1

$\begin{cases} x=3 \\ y=4 \end{cases}$

2 Elimination method

$2x+8y=-6$

<Substitution method>

$x=-4y-3$

$\begin{cases} x=5 \\ y=-2 \end{cases}$

3

$\begin{cases} x=-3 \\ y=-1 \end{cases}$

4

(1) $\begin{cases} x=-4 \\ y=-1 \end{cases}$

(2) E $\begin{cases} x=\frac{1}{5} \\ y=\frac{2}{5} \end{cases}$

67

1

$\begin{cases} x=1 \\ y=-2 \end{cases}$

2

$\begin{cases} x=2 \\ y=11 \end{cases}$

3

$\begin{cases} x=3 \\ y=-4 \end{cases}$

4

$x=5$

$y=3$

5

(1) $\begin{cases} x=-6 \\ y=0 \end{cases}$

(2) E $\begin{cases} x=\frac{1}{5} \\ y=\frac{11}{5} \end{cases}$

68

1

$\begin{cases} x=5 \\ y=2 \end{cases}$

2

$\begin{cases} x=2 \\ y=-1 \end{cases}$

3

$\begin{cases} x=-3 \\ y=4 \end{cases}$

4

$\begin{cases} x=10 \\ y=-2 \end{cases}$

5

E $\begin{cases} x=5 \\ y=-2 \end{cases}$

6

E $\begin{cases} x=\frac{1}{5} \\ y=\frac{11}{5} \end{cases}$

69

1

$\begin{cases} x=-2 \\ y=-5 \end{cases}$

2

$\begin{cases} x=5 \\ y=4 \end{cases}$

3

$\begin{cases} x=3 \\ y=4 \end{cases}$

4

$\begin{cases} x=3 \\ y=7 \end{cases}$

5

$\begin{cases} x=3 \\ y=2 \end{cases}$

70

1

(1) $\begin{cases} x=4 \\ y=-3 \end{cases}$

2

$\begin{cases} x=\frac{20}{11} \\ y=-\frac{3}{11} \end{cases}$

3

$\begin{cases} x=3 \\ y=-4 \end{cases}$

4

(4) $\begin{cases} x=3 \\ y=2 \end{cases}$

5

(5) $\begin{cases} x=3 \\ y=-4 \end{cases}$

71

Ex.

(1)

[Sol]

② − ① $y + 2z = 8$ ④

③ − ② $y + 4z = 14$ ⑤

⑤ − ④ $2z = 6$

$z = 3$

Substituting $z = 3$ into ④,

$y + 6 = 8$

$y = 2$

Substituting $y = 2$ and $z = 3$ into ①,

$x + 2 + 3 = 6$

$x = 1$

$\begin{cases} x = 1 \\ y = 2 \\ z = 3 \end{cases}$

72

(1) $\begin{cases} x = 1 \\ y = 2 \\ z = 3 \end{cases}$

73

(1) $\begin{cases} x = 2 \\ y = -3 \\ z = -4 \end{cases}$

Form two equations without x.

$\begin{cases} x = 1 \\ y = 2 \\ z = -3 \end{cases}$

74

(1) $\begin{cases} x = -1 \\ y = 2 \\ z = -4 \end{cases}$

(2) $\begin{cases} x = -4 \\ y = -2 \\ z = 3 \end{cases}$

Form two equations without y.

$\begin{cases} x = 3 \\ y = 2 \\ z = -1 \end{cases}$

75

(1) $\begin{cases} x = 2 \\ y = -1 \\ z = -5 \end{cases}$

(2) $\begin{cases} x = -2 \\ y = \frac{3}{2} \\ z = 4 \end{cases}$

71

(1) $\begin{cases} x = 3 \\ y = 2 \\ z = -1 \end{cases}$

(3) $\begin{cases} x = 4 \\ y = 3 \\ z = -2 \end{cases}$

72

(1) $\begin{cases} x = 1 \\ y = 2 \\ z = 3 \end{cases}$

73

(1)

(Form two equations without z.)

$\begin{cases} x = -2 \\ y = 3 \\ z = 4 \end{cases}$

74

(1) $\begin{cases} x = 1 \\ y = -2 \\ z = 4 \end{cases}$

75

(1) $\begin{cases} x = 2 \\ y = -1 \\ z = -5 \end{cases}$

76

[Sol]

① × 2 $12x + \boxed{4}y + 6z = 84$ …④

②×3 $15x - \boxed{9}y + 6z = 60$ ⑤

④ - ⑤ $-3x + \boxed{13}y = -21$ ⑥

③ × 2 $10x - \boxed{6}y + 4z = 10$ ⑦

③+⑦ $12x - \boxed{15}y = 15$ ⑧

⑥×4 $-12x + \boxed{52}y = 96$ ⑨

⑧+⑨ $37y = 111$

$y = 3$

$\begin{cases} x = 5 \\ y = 3 \\ z = 2 \end{cases}$

77

(1) $\begin{cases} x = 2 \\ y = 4 \\ z = -3 \end{cases}$

78

(1) $\begin{cases} x = 1 \\ y = -2 \\ z = 5 \end{cases}$

79

(1) $\begin{cases} x = 9 \\ y = 11 \\ z = 8 \end{cases}$

80

(1) $\begin{cases} x = 5 \\ y = -4 \\ z = 2 \end{cases}$

77

$\begin{cases} x = -1 \\ y = \dfrac{1}{2} \\ z = 3 \end{cases}$

76

(2) $\begin{cases} x = 3 \\ y = 2 \\ z = 1 \end{cases}$

78

$\begin{cases} x = 1 \\ y = -4 \\ z = 3 \end{cases}$

79

(2) $\begin{cases} x = 1 \\ y = 2 \\ z = -3 \end{cases}$

80

(2) $\begin{cases} x = -2 \\ y = 3 \\ z = 1 \end{cases}$

78

$\begin{cases} x = -1 \\ y = 2 \\ z = 3 \end{cases}$

79

(3) $\begin{cases} x = -4 \\ y = 3 \\ z = -2 \end{cases}$

H71a KUMON H 71

Sistema de Equações Lineares

H77a KUMON H 77

Sistema de Equações Lineares

com Três e Quatro Incógnitas 1

(50 pontos)

Resolva os sistemas abaixo.

(1) $\begin{cases} 3x - 2y - 4z = 10 \\ 2x - 4y - z = -9 \\ 6x - 5y - 7z = 13 \end{cases}$

(2) $3x-2y-4z=10$

(4) $-8x+16y+4z=+36$

$-5x+14y=46$

(2) $\times 7 = 14x-28y-7z=-63$

$-6x+5y+7z=-13$

$8x-23y=-76$ (5)

$-5x+14y=46$ (8)

$40x-115y=-380$

$-40x+112y=368$

$-3y=-12$

$y=4$

$-5x+56=46$

$-5x=-56+46$

$-5x=-10$

$x=2$

$2.2-4.4-z=-9$

$-z=-9+12$

$-z=3$

$z=-3$

Sistema de Equações Lineares

H77b

(2) ① $2x + 4y + 3z = 9$
② $3x - 2y + 5z = 11$
③ $5x - 6y + 7z = 13$

② x2 = $6x - 4y + 10z = 22$ ④

① + ④ = $8x + 13z = 31$ ⑤

⑧ x2 = $8x + 16z = 40$ ⑨

⑨ - ⑤ = $3z = 9$

$z = \frac{9}{3}$

$z = 3$

② x3 = $9x - 6y + 15z = 33$ ⑥

③ x-1 = $-5x + 6y - 7z = -13$ ⑦

⑥ + ⑦ = $4x + 8z = 20$ ⑧

$4x + 8 \cdot 3 = 20$

$4x = 20 - 24$

$x = \frac{-4}{4}$

$x = -1$

$2 \cdot -1 + 4y + 3 \cdot 3 = 9$

$y = \frac{1}{2}$

$\begin{cases} x = -1 \\ y = \frac{1}{2} \\ z = 3 \end{cases}$

H81–85 (6–10 min)

81

(1) $\begin{cases} x=7 \\ y=2 \\ z=4 \end{cases}$

(2) $\begin{cases} x=5 \\ y=-1 \\ z=-2 \end{cases}$

(3) Since equation ③ does not have y, first form an equation without y from equations ① and ②

$\begin{cases} x=3 \\ y=2 \\ z=1 \end{cases}$

82

1 $\begin{cases} x=2 \\ y=-1 \\ z=4 \end{cases}$

2 $\begin{cases} x=-2 \\ y=\dfrac{3}{2} \\ z=4 \end{cases}$

( ) $\begin{cases} x=-1 \\ y=2 \\ z=-5 \end{cases}$

H81–85

83

1 $\begin{cases} x=2 \\ y=-3 \\ z=4 \end{cases}$

. $\begin{cases} x=2 \\ y=-4 \\ z=5 \end{cases}$

$\begin{cases} x=1 \\ y=2 \\ z=-3 \end{cases}$

84

1 $\begin{cases} x=-1 \\ y=3 \\ z=5 \end{cases}$

- $\begin{cases} x=2 \\ y=5 \\ z=3 \end{cases}$

$\begin{cases} x-5 \\ y=-3 \\ z=2 \end{cases}$

85

1 $\begin{cases} x=6 \\ y=4 \\ z=2 \end{cases}$

/ $\begin{cases} x=6 \\ y=2 \\ z=2 \end{cases}$

$\begin{cases} x=\dfrac{1}{2} \\ y=\dfrac{1}{3} \\ z=\dfrac{1}{6} \end{cases}$

Consider this!

H86–88 (6–10 min)

86

(1) $\begin{cases} x=6 \\ y=2 \\ z=1 \end{cases}$

(2) $\begin{cases} x=3 \\ y=1 \\ z=1 \end{cases}$

86

(3) $\begin{cases} x=3 \\ y=1 \\ z=-3 \end{cases}$

87

(1) $x-z=-1$

$\begin{cases} x=4 \\ y=1 \\ z=5 \end{cases}$

6

2

1

$\begin{cases} x=2 \\ y=1 \\ z=6 \end{cases}$

87

(4) $\begin{cases} x=9 \\ y=-3 \\ z=-2 \end{cases}$

Grade 6 is a great year at Plum Tree Park School! Since your child is a p
o dec

H86–88

88a

$\begin{cases} x=4 \\ y=3 \\ z=2 \\ w=1 \end{cases}$

(Reference)

(Form three equations without x.)

(Sol)

①−②　$y-2z+w=12$ …④

③+④　$y+z+w=4$ …⑤

③−④　$y-3z-2w=11$ …⑥

⑤−⑥　$5z+3w=-7$ …⑦

⑧×2　$2x+12z+4w=16$ …⑨

⑨+⑩　$9w=9$

$w=1$

Substituting $w=1$ into ⑧,

$-z-6=-8$

$-z=-2$

$z=2$

Substituting $z=2$ and $w=1$ into ⑤,

$y+2+1=4$

$y+3=4$

$y=3$

Substituting $y=3$, $z=2$ and $w=1$ into ①,

$x+3+2+1=10$

$x=4$

88b

(2) $\begin{cases} x=4 \\ y=3 \\ z=-2 \\ w=1 \end{cases}$

(Reference) *If equation numbers ①–④ are assigned to the given equations

(Form three equations without x.)

(Sol)

①−②　$-2y+3z-4w=-16$ …⑤

②−③　$-y+3z-2w=-11$ …⑥

③−④　$2y-4z+w=15$ …⑦

⑤+⑦　$-z-3w=-1$ …⑧

⑥×2　$-2y+6z-4w=-22$ …⑨

⑦+⑨　$2z-3w=-7$ …⑩

⑧−⑩　$-3z=6$

$z=-2$

Substituting $z=-2$ into ⑧,

$2-3w=-1$

$-3w=-3$

$w=1$

Substituting $z=-2$ and $w=1$ into ⑥,

$-y-6-2=-11$

$-y=-3$

$y=3$

Substituting $y=3$, $z=-2$ and $w=1$ into ①,

$x+3+2+1=10$

$x=4$

89a

1

[Sol 1]

$$\begin{cases} -x+y=10 & ⑤ \\ -y+z=-6 & ⑥ \end{cases}$$

$$\begin{cases} x=-3 \\ y=7 \\ z=1 \\ w=0 \end{cases}$$

[Reference]

(Form three equations without w.)

[Sol 1]

② − ③ $-x+y=10$ ⑤

③ − ④ $-y+z=-6$ ⑥

⑤ + ⑥ $2y+z=15$ ⑦

⑦ − ⑥ $3y=21$

$y=7$

Substituting $y=7$ into ⑤,

$-x+7=10$

$x=3$

$x=-3$

Substituting $y=7$ into ⑥,

$7+z=6$

$z=1$

Substituting $y=7$ and $z=1$ into ②,

$7+1+w=8$

$w=0$

[Sol 2]

$$\begin{cases} 3x+3y+3z+3w=15 \\ x+y+z+w=5 \end{cases}$$

(Form ⑤ from ① + ② + ③ + ④, then use ⑤ ÷ 3 and ① + ② + ③ + ④)

[Sol 2]

①+②+③+④

$\boxed{3x+3y+3z+3w}=\boxed{15}$ …⑤

⑤÷3

$x+y+z+w=5$

⑥ − ① $w=0$

⑥ − ② $x=3$

⑥ − ③ $y=7$

⑥ − ④ $z=1$

89b

$$\begin{cases} x=0 \\ y=-1 \\ z=2 \\ w=1 \end{cases}$$

[Reference]

(Equation numbers ①–④ are assigned to the given equations.

(Form three equations without z.)

Sol

$2y \quad w = 3$

$4x + y + 3w \quad 2$ ②

④ + ④ $5x + 3y - 2w = 5$ ⑤

③ × 5 $20x + 5y + 15w = 10$ ⑥

② × 4 $20x + 12y - 8w = -20$ ⑦

⑥ − ⑤ $-7y + 23w = 30$ ⑧

⑦ × 23 $46y - 23w = -69$ ⑨

⑧ + ⑨ $39y = -39$

$y = -1$

Substituting $y = -1$ into ⑤,

$x = -3$

$w = 1$

$w = 1$

Substituting $y = -1$ and $w = 1$ into ②,

$4x = 1 + 3 - 2$

$4x = 0$

$x = 0$

Substituting $x = 0$, $y = -1$ and $w = 1$ into ①,

$0 = 1 + z + 1 - 2$

$z = 2$

90

1 $\begin{cases} x=3 \\ y=-4 \\ z=2 \end{cases}$

2 $\begin{cases} x=3 \\ y=1 \\ z=-2 \end{cases}$

90

3 $\begin{cases} x=2 \\ y=-3 \\ z=4 \end{cases}$

91

Ex.

1 $x = a - b$

2 $x = b + a$

3 $x = b - a$

4 $x = a - b$

5 $x = -a + b$

6 $x = \frac{a}{3}$

7 $x = \frac{a - b}{5}$

8 $x = -\frac{a + 1}{6}$

92

Ex.

1 $x = a - b$

2 $x = -b - a$

3 $x = 6a - 6$

4 $x = \frac{a - b}{3}$

5 $x = 2b + a$

6 $x = -\frac{a}{4}$

7 $x = \frac{a - b}{5}$

8 $x = -\frac{a - 1}{6}$

93

Ex.

1 $x = -a + 1$

2 $x = a - 2$

3 $x = -\frac{a + b}{3}$

4 $x = 4a - 4$

94

Ex.

1 $x = \frac{1}{3}$

2 $x = \frac{4b + a}{3}$

3 $x = \frac{a - 2}{2}$

4 $x = \frac{a + 3b}{3}$

5 $x = -2a + 1$

6 $x = \frac{4x - 6}{3}$

7 $x = \frac{3}{2}$

8 $x = \frac{x - 2}{3} = \frac{5}{6}$

9 $x = \frac{6}{5}$

10 $x = \frac{x - 5}{4} = \frac{6}{10}$

11 $x = \frac{10}{3}$

12 $x + \frac{1}{3} = \frac{3}{4}$

13 $x = \frac{5}{12}$

14 $x + \frac{7}{6} = -\frac{1}{3}$

15 $x = -\frac{3}{2}$

16 $\frac{1}{6} = \frac{1}{2}$

17 $x = \frac{2}{3}$

18 $x - \frac{1}{3} = \frac{5}{12}$

19 $x = \frac{1}{4}$

H95–97 (6–8 min)

95

$3x$ x 10

$x = 5$

$\frac{x}{3}$ $x - 8$

$x = 12$

$\frac{t}{5}$ t 4

$x = 10$

$\frac{2}{3}x - 5$ $\frac{x}{4}$

$x = 12$

96

x

$160x = 1280$

$8x = 960$

97

Ans $x + 5$ blue shirts

(a) Ans $(x - 5)$ blue shirts

(b) lower

Ans $(x - 5)$ red shirts

(c) Ans $(x + 5)$ red shirts

95

2 $x - 5$ 6

$x = 8$

$\frac{3}{4}(x + 2) = 9$

$x = 10$

$2x + 5 = 26$

$x = 7$

$x + 28 = 3x + 6$

$x =$

96

80 5 $\cdot$ 116 $=$ 1660

Ans 9 bags

(a) Let x be the weight of [illegible] chocolates

$140 + 7 + 6x = 1490$

Ans 85 g

(b) Let x be the weight of one box of chocolates.

$(x$ 1900 20

Ans 140 g

97

[illegible] $x + 3$ therefore

$x + (x + 3) = 515$

[illegible] x 3 therefore

x 3 1

Ans 256 [illegible] 259

H98–100 (6–8 min)

98

98

99

H98–100

100

99

100

H101–104 (6–8 min)

101

Ex.

(1) $\begin{cases} x + y = 14 \\ 120x + 140y = 1800 \end{cases}$

Ans. Salt: 8 bags; Sugar: 6 bags

101

(2) Let x be the number of 50g balls and y be the number of 120g balls.

$\begin{cases} x + y = 20 \\ 50x + 120y = 1560 \end{cases}$

Ans. 50g balls: 12 balls, 120g balls: 8 balls

(3) $\begin{cases} \boxed{120}x + \boxed{90}y = 2160 \\ x = y + 4 \end{cases}$

Ans. 120g balls: 12 balls, 90g balls: 8 balls

102

$\begin{cases} 2x + 5y = 400 \\ 3x + 8y = 620 \end{cases}$

Ans. Plate: 100 g; Spoon: 40 g

Let x be the weight of one bag of almonds and y be the weight of one bag of peanuts.

$\begin{cases} 2x + 7y = 760 \\ 4x + 5y = 980 \end{cases}$

Ans. A bag of almonds: 170 g; A bag of peanuts: 60 g

102

$\begin{cases} 5x + 3y = 475 \\ 3x = 2y \end{cases}$

Ans. Fork: 50 g; Spoon: 75 g

(4) Let x be the weight of one bag of almonds and y be the weight of one bag of peanuts.

$4x + 3y = 750$

$3x + 5y = 14y$

Ans. A bag of almonds: 150 g; A bag of peanuts: 50 g

103

$x = y = 1000$

$x = y + 200$

Ans. School A: 600 students; School B: 400 students

Let x be the number of tourists who visited the aquarium and y be the number of tourists who visited the zoo.

$\begin{cases} x + y = 1800 \\ x = y - 400 \end{cases}$

Ans. Aquarium: 700 tourists; Zoo: 1100 tourists

103

$\begin{cases} x + y = 1800 \\ x = 2y \end{cases}$

Ans. School A: 1200 students; School B: 600 students

(4) Let x be the number of tourists who visited the aquarium and y be the number of tourists who visited the zoo.

$\begin{cases} x + y = 2400 \\ x = \frac{1}{3}y \end{cases}$

Ans. Aquarium: 600 tourists; Zoo: 1800 tourists

104

(1) $\begin{cases} x = y + \boxed{400} \\ x + 800 = \boxed{3}(y - 800) \end{cases}$

Ans. Town A: 2200 people; Town B: 1800 people

(2) Let x be the number of members in Team Red and y be the number of members in Team Blue.

$\begin{cases} x = y + 5 \\ x + 15 = 2(y - 15) \end{cases}$

Ans. Team Red: 55 members; Team Blue: 50 members

104

(3) Let x be the number of people in Town A and y be the number of people in Town B.

$\begin{cases} x = y - 300 \\ x + 600 = 2(y - 600) \end{cases}$

Ans. Town A: 1200 people; Town B: 1500 people

(4) Let x be the number of members in Team Red and y be the number of members in Team Blue.

$\begin{cases} x = y - 4 \\ x - 7 = \frac{1}{3}(y + 7) \end{cases}$

Ans. Team Red: 16 members; Team Blue: 20 members

105

$$\begin{cases} 6x + y = 1620 \\ 2x + y = 660 \end{cases}$$

Ans The weight of the box $180\,g$

The weight of the milk after it was drunk is $\frac{y}{2}$

$$\begin{cases} x + y = 280 \\ x + \frac{y}{2} = 260 \end{cases}$$

Ans The weight of the glass $120\,g$

105

Let x be the weight of the cup and y be the weight of the tea before it was drunk

$$\begin{cases} x + y = 200 \\ x + \frac{y}{2} = 160 \end{cases}$$

Ans The weight of the cup $120\,g$

(4) The weight of the water after it was drunk is $\frac{2}{3}y$

$$\begin{cases} x + y = 760 \\ x + \frac{2y}{3} = 640 \end{cases}$$

Ans The weight of the bottle $400\,g$

106

$$\begin{cases} x + y = 300 \\ \frac{1}{10}x + \frac{y}{60} = 8 \end{cases}$$

Ans 120 men, 180 women

(2) Let x be the total number of men and y be the total number of women

$$\begin{cases} x + y = 300 \\ \frac{60}{100}x + \frac{20}{100}y = 136 \end{cases}$$

Ans 110 men, 260 women

106

Let x be the total number of roses and y be the total number of tulips

$$\begin{cases} x + y = 3000 \\ \frac{70}{100}x + \frac{60}{100}y = 2000 \end{cases}$$

Ans 2000 roses, 1000 tulips

$$\begin{cases} \frac{40}{100}x + \frac{20}{100}y = 1100 \\ \frac{60}{100}x = \frac{80}{100}y \end{cases}$$

Ans. 2000 roses, 1500 tulips

107

(1) $$\begin{cases} x + y = 480 \\ \frac{90}{100}x + \frac{110}{100}y = 456 \end{cases}$$

Ans. 36

[Sol 2] $$\begin{cases} x + y = 480 \\ \frac{3}{10}x + \frac{11}{10}y = 456 \end{cases}$$

Ans 250 blue shirts, 230 green shirts

107

Let x be the number of blue shirts last year and y be the number of green shirts last year

[Sol 1] $$\begin{cases} x + y = 500 \\ \frac{115}{100}x + \frac{95}{100}y = 523 \end{cases}$$

[Sol 2] $$\begin{cases} x + y = 500 \\ \frac{15}{100}x - \frac{5}{100}y = 23 \end{cases}$$

Ans. 240 blue shirts, 260 green shirts

*Students can use either [Sol 1] or [Sol 2]

108

(1) $$\begin{cases} x + y = 9 \\ 10y + x = 2(10x + y) - 9 \end{cases}$$

Ans. 36

(2) $$\begin{cases} x + y = 7 \\ 10y + x = 2(10x + y) + 2 \end{cases}$$

Ans 25

108

(3) Let x be the tens digit and y be the ones digit

$3x = y + 1$

$10y + x = 2(10x + y) + 7$

Ans 38

109

(1)
$$\begin{cases} x + y = 60 \\ \frac{x}{36} + \frac{y}{4} = 3 \end{cases}$$

Ans. By car: 54 km; By walking: 6 km

(2) Let x be the distance I rode a bike and y be the distance I walked

$$\begin{cases} x + y = 14 \\ \frac{x}{9} + \frac{y}{3} = 2 \end{cases}$$

Ans. By bike: 12 km; By walking: 2 km

109

(3) Let x be the distance my sister rode a bike and y be the distance she walked.

$$\begin{cases} x + y = 26 \\ \frac{x}{16} + \frac{y}{4} = 2 \end{cases}$$

Ans. By bike: 24 km; By walking: 2 km

(4) 1 hour and a half is expressed as $1\frac{30}{60} = \frac{3}{2}$ (hours)

Let x be the distance my brother drove at 50 km/h and y be the distance he drove at 80 km/h.

$$\begin{cases} x + y = 90 \\ \frac{x}{50} + \frac{y}{80} = \frac{3}{2} \end{cases}$$

Ans. At 50 km/h: 50 km; At 80 km/h: 40 km

110

(1)
$$\begin{cases} 5x + 8y = 190 \\ x + y = 31 \end{cases}$$

Ans. From A to B: 1 hour(s); From B to C: 2 hour(s)

(2) Let x be the time taken on the way to B and y be the time taken on the way back from B

$$\begin{cases} 40x = 30y \\ x + y = 7 \end{cases}$$

Ans. On the way to B: 3 hour(s), On the way back from B: 4 hour(s)

110

(3)
$$\begin{cases} 3x + 2y = 270 \\ y = x + 35 \end{cases}$$

Ans. Street: 40 km/h; Highway: 75 km/h

(4) Let x be the distance Jacob walked and y be the distance he ran.

$$\begin{cases} x + y = 1200 \\ \frac{x}{50} + \frac{y}{150} = 20 \end{cases}$$

Ans. By walking: 900 m; By running: 300 m

111

Ex.

(1) $2ab$

(2) $3ab$

(3) $15ab$

(4) $20ab^3$

(5) $3abcxy$

(6) $\frac{12}{5}xyz$

(7) $\frac{1}{2}abc^2$

(8) $a^2b^2c^7$

112

Ex.

1 $32a^2$

2 $-30x^2$

3 $-18y^2$

4 $12x^2$

5 $-5a^2$

Ex.

6 x^5

7 x^9

8 x^4

9 y^4

10 a^7

113

Ex.

(1) $-12x^7$

(2) $15a^6$

(3) $-6a^8$

(4) $2x^4$

(5) $-6a^5$

(6) $10a^7$

(7) $-10x^4$

(8) $-3x^3$

(9) $4a^4$

(10) $4a^7$

114

$28x^3y$

$3x^3y$

$-12x^3y^2$

$-16x^3y$

$3a^4b^3x$

0

$-\frac{5}{2}x^4y^5$

$12x^7y^6$

$3x^4y^5$

115

Ex.

1 a^{15}

2 a^8b^2

3 $9a^4$

4 $16a^6b^2$

5 $27a^6$

6 $8a^6b^3c^9$

7 $a^{17}b^{16}c^4$

8 $81a^{12}b^8c^4$

111

Ex.

9 $-6xy$

10 $-6xy$

11 $-6abx$

12 $30xy$

13 $40abxy$

14 $21abc$

15 $-\frac{8}{3}mxy$

16 $-\frac{1}{3}abc$

17 $-24xyz$

112

11 3

12 x^6

(13) a^5

(14) a^9

(15) b^7

16 c^5

(17) y^6

18 z^4

(19) x^8

(20) y^9

113

Ex.

11 $12ab^5$

12 $-18a^3b$

(13) $\frac{5}{4}a^2b$

(14) $-12x^8y^6$

15 $-18x^6y^4$

16 $6a^7b^4$

17 $-6a^2b^3$

18 $-24a^3x^2y$

19 $24a^9b^{10}$

114

9 $-2x^8$

(11) $-24x^9$

(12) $-40a^3x^2$

13 $-30x^3y^2z^2$

14 $60a^2b^3c$

15 $60x^6y^8z^4$

16 $12x^5y^4$

(17) $60a^3b^3$

18 $-\frac{8}{21}a^6x^5y^6$

115

9 12

10 $25x^4y^8$

(11) $27x^9y^3z^6$

12 $\frac{1}{4}a^2b^4c^6$

13 $\frac{a^3b^9}{8}$

14 $\frac{8}{27}x^6y^3z^9$

(15) $6\ x^{24}$

(16) $64x^{24}$

*If students make a lot of mistakes, have them write the intermediate steps.

116

(1) $8a^6$

(2) $2a^6$

(3) $5x^4y^6$

(4) $5a^2b^4c^6$

(5) $2a^3b^3c^6$

(6) 3 3 6 $3x^4y^3z^6$

(7) $5x^9y^3z^9$

(8) $18x^8y^4$

(9) $2x^3y^4$

(10) $16x^3y^9$

(11) $25x^6y^8$

(12) $5x^4y^8$

(13) 2 3 $72a^5$

(14) $72a^{12}$

(15) x^6y^6

(16) $27x^9y^9$

117

Ex.

(1) $-8a^6b^9$

(2) $16a^8b^{12}$

(3) a^6b^2

(4) $-64x^3$

(5) $-27a^3c^9$

(6) $81a^8b^4$

(7) $-243b^5c^{10}$

(8) $64a^6b^{12}c^{18}$

(9) $-\frac{8}{27}a^6b^9$

(10) $\frac{16}{81}a^8b^{12}$

(11) $-\frac{1}{32}a^5b^{15}$

(12) $\frac{1}{16}a^4b^8$

(13) $\frac{1}{81}a^4b^{12}$

(14) $-\frac{1}{32}a^{10}x^{15}$

(15) $-\frac{27}{64}a^{12}b^9$

(16) $-\frac{32}{243}a^{10}b^5c^{15}$

118

(1) a^2b^4

(2) $-a^2b^4$

(3) $25x^4y^6$

(4) $-5x^4y^6$

(5) $16a^4b^8c^4$

(6) $-2a^4b^8c^4$

(7) $-27x^3y^6z^9$

× 3 6 $-24a^6b^7$

(9) $-2ax^4y^3$

(10) $-\frac{2}{3}ab^5c^6$

(11) $-2a^2b^6$

(12) $24ab^3c^6$

(13) $\frac{16}{27}a^4b^6$

(14) $-3a^6b^8$

*If students make a lot of mistakes, have them write the intermediate steps

119

$2ab^6c^3$

$-2x^3y^3z^6$

$\frac{1}{2}a^4b^7$

$-\frac{1}{4}a^5b^9$

$-\frac{1}{6}ax^3y^2$

$\frac{1}{12}ax^4y^3$

$8x^3y^5z^2$

$\frac{8}{9}a^2b^6c^6$

$\frac{4}{3}a^2b^5c^4$

(10) 4 2 3 3 $-64x^7y^5$

(11) $24x^4y^5z^{11}$

(12) $-2x^7y^5$

(13) $a^6b^3x^6$

(14) $-\frac{3}{64}x^7y^9$

120

(1) $-12a^4b^6$

3 $27x^3y^6z^9$

(3) $-\frac{8}{27}a^3b^6c^3$

(4) $64x^6$

(5) $64x^6$

(6) $3x^7y^7$

(7) $-3x^9y^3z^9$

(8) $32x^5y^{10}z^5$

(9) $-6a^{11}b^{13}$

(10) $20x^5y^3z^2$

11 $4x^3y^8z^6$

(12) x^6y^{10}

(13) $-108a^5b^6c^6$

(14) $-\frac{3}{64}x^7y^9$

121

Ex.

1 a^3

2 $\frac{1}{a^3}$

3 a^3

4 $\frac{1}{a^2}$

5 a^4

6 a^2

7 $\frac{1}{a}$

8 a^4

9 a^4

10 $\frac{1}{a}$

11 $\frac{1}{a^2}$

12 1

13 a^3

14 1

122

Ex.

1 $2x^2$

2 2

(3) $\frac{1}{2x^3}$

(4) $\frac{3}{4x^2}$

5 $\frac{9x^4}{5}$

6 $3x$

Ex.

(7) $\frac{4b}{a^3}$

(8) $\frac{6a^2c^2}{b^2}$

9 $6a^4b^4$

(10) $\frac{ac^2}{3}$

(11) $\frac{b}{9}$

12 $\frac{4xy^2}{3}$

123

1 $4x$

2 $\frac{3x^2}{2y^3}$

(3) $\frac{8a^3}{3b^2}$

4 $\frac{8a^6b^{12}}{3}$

5 $\frac{2}{ab^3}$

6 $\frac{2a^2}{b^2}$

7 $\frac{x^6y^{12}}{4}$

(8) $-\frac{5x}{9}$

9 $\frac{x}{5a}$

(10) $-4b^3$

(11) $-\frac{2x^2}{y^2}$

12 $-\frac{24b}{a}$

(13) $\frac{20}{3y^3}$

(14) $\frac{a^4}{72b^6}$

124

1 $\frac{7}{3a}$

(2) $\frac{a^3}{4}$

(3) $\frac{4ab^2}{5}$

(4) $-\frac{3y^3}{2x}$

(5) $\frac{8a^2}{3b^2}$

6 $-\frac{x^3}{24y^3}$

(7) $\frac{a^5b^7}{}$ $-\frac{8a}{b^3}$

(8) $-\frac{3a^3b}{2}$

(9) $\frac{10y^3}{x^3}$

(10) $-\frac{x^3y^4}{7}$

(11) $-9x^3y^4$

125

Ex.

1 $2a^2 + 6ab$

2 $3a^2 - 12ab$

3 $-2a^2 + 6ab$

4 $-3x^2 + 6xy - 15xz$

(5) $8a^2b - 12ab^2 + 16ab$

(6) $-12a^2 + 20ab$

(7) $-12a^2b + 20ab^2$

(8) $-12x^3y + 4x^2y^2 - 8xy^3$

9 $-2a + 6b$

10 $-3a^2b + 6ab^2$

(11) $20x^2 - 10xy$

12 $-6ab + 15a$

13 $-15a^2 - 20ab + 10a$

14 $a^2 - 3ab + 2a$

(15) $6x^2y + 9xy$

16 $12ab - 20b^2$

(17) $2x^2 - 3xy + 4x$

126

Ex.

1) $5x^2-2x$

2) $-x^2-4x$

(3) x^2+8x

(4) $8x^2-9x$

(5) $4x^2+5xy$

(6) $3x^2-4xy$

(7) $2x^2-3y^2$

126

8) a^2-b^2

(9) $a^2-2ab+b^2$

(10) 0

(11) $2a^3+a^2$

(12) $-xy$

(13) a^3+b^3

127

Ex.

1) $3x-4$

2) $2x-3$

3) $3a-5$

4) $a-3$

5) $3a-1$

6) $2x^2-1$

7) $4x^2-6x+3$

127

8) $-3a-2$

9) $-2y+3x$
Alternative Answer
$(3x-2y)$

10) $-3x-2$

11) $3a-5$

(12) $2x-3y$

(13) $1-2ab^2$

(14) $2x^3-4x+1$

(15) $2a-\frac{3}{2}+3a^2$
$\left(3a^2+2a-\frac{3}{2}\right)$

128

Ex.

(1) $a+c$

(2) $a+b$

(3) $a+2$

(4) $\boxed{a^2}\ \boxed{a}\ \boxed{a}$

(5) $5x+1$

(6) $b-c+1$

(7) $3x^2-x+1$

128

(8) $\boxed{2}$

(9) $1+\frac{b}{a}$

10) $a+2+\frac{b}{a}$

11) $a+1+\frac{1}{a}$

(12) $a-1+\frac{3}{a}$

13) $\frac{x^3}{3}-x+\frac{2}{x}$

(14) $\frac{x}{2}-\frac{3}{2}-\frac{1}{x}$

15) $\frac{1}{2y}-\frac{1}{x}+\frac{y}{2x^2}$

129

(1) x^2+x-1

(2) $-x^3-x+1$

(3) $-2a^2+4a-3$

4) $-3x+1$

(5) $5-3a^2x^2$

(6) $6x-4y+2$

$5x-3xy+1$

129

Ex.

(1) a^3+ab

(2) $4a-3$

(3) $-3x+2y$

(11) $-a^2+3a-2$

(12) $-3x^3+1$

(13) $-2b+ab^2$

14) $2x^2-4xy^2$

130

1) $\frac{4}{3a^2}$

2) $\frac{3}{m}$

3) $\frac{3a^3b^3}{2c^4}$

4) $\frac{4y^2}{x}$

5) $-\frac{1}{2a^2b}$

6) $-\frac{3x^3}{2y^3}$

7) $-4x^4y^4$

130

(8) $2a^2b-4ab^2+6ab$

(9) $-x^2-8x$

(10) $-4x^2-3xy$

(11) $3x^2-4x+1$

(12) $2x^2-3x-1$

(13) $2x-1+\frac{y}{x}$

14) $-a+2c+4b$
$(-a+4b+2c)$

(15) $-a^2+2a^2b^3$

131

Ex.

(1) $6ax+4ay+3bx+2by$

(2) $6ax+4ay-3bx-2by$

(3) $2ax+3ay-4bx-6by$

(4) $2ax-3ay-4bx+6by$

(5) $8a^2+6ax-12ab-9bx$

(6) $8a^2-6ax+12ab-9bx$

(7) $2a^2-6ax-ab+3bx$

131

Ex.

(8) $x^2+2x-15$

(9) $x^2+8x+15$

(10) $x^2-8x+15$

(11) $2x^2+13x+15$

(12) $2x^2-7x-15$

(13) $2x^2-13x+15$

(14) $2x^2+7x-15$

132

(1) x^2+6x+8

(2) x^2-2x-8

(3) x^2-9

(4) x^2+6x+9

(5) $6x^2-13x-5$

(6) $6x^2+13x-5$

7 $16x^2-49$

(8) $16x^2+56x+49$

132

9 9

(10) $2x^2+xy-10y^2$

(11) $2x^2-xy-10y^2$

(12) $2x^2-9xy+10y^2$

(13) x^2-4y^2

(14) $4x^2+20xy+25y^2$

133

$3x^2+13xy+12y^2$

$3x^2-5xy-12y^2$

(3) $3x^2+5xy-12y^2$

$3x^2-13xy+12y^2$

x^2-y^2

x^2-9y^2

$9x^2-16y^2$

133

$9x^2-y^2$

(9) $4x^2-25y^2$

(10) x^2-16

(11) $4x^2-49$

(12) $9x^2-4$

(13) $16x^2-1$

(14) $64x^2-81$

134

1 x^2+6x+9

(2) $x^2+12x+36$

(3) $4x^2+4x+1$

(4) $4x^2+20x+25$

(5) $9x^2+24x+16$

(6) $16x^2+24xy+9y^2$

(7) $36x^2+60xy+25y^2$

134

(8) x^2-6x+9

(9) $x^2-12x+36$

(10) $4x^2-4x+1$

(11) $4x^2-20x+25$

(12) $9x^2-24x+16$

(13) $16x^2-24xy+9y^2$

(14) $36x^2-60xy+25y^2$

135

Ex.

(1) $x^3+2x^2-5x+12$

(2) $x^3+7x^2+7x-15$

(3) $2x^3-3x^2+4x+3$

(4) $3x^3-5x^2+7x+3$

(5) $4x^3+9x^2+14x+3$

(6) $2x^3-2x+12$

(7) x^3-x-6

(8) $2x^3-x^2+9$

(9) x^3+8

(10) $3x^3-7x^2-14x+10$

(11) $3x^3-4x^2+25$

(12) $3x^3+4x^2-25$

136

[In H135-140, check if students write in descending order of x]

$2x^3-15x^2+12x-35$

(2) $4x^3+9x+5$

(3) $2x^3+x^2-9$

(4) $2x^3-x^2-12x-9$

$2x^3-7x^2+9$

(6) $6x^3-19x^2+13x-2$

(7) $8x^3-28x^2+48$

(8) $2x^3-2x-12$

(9) $-9x^3-9x^2+25x+25$

(10) $6x^4+12x^3-13x^2-20x+5$

137

Ex. $2x^4+7x^3-8x^2+29x-30$

$6x^4-13x^3+23x^2-13x+5$

$-4x^4+12x^3-9x^2+25$

(4) $6x^4-11x^3-x^2+10x-6$

(5) $2x^4-8x^3+8x^2-18$

(6) $3x^5-6x^4-20x^3+5x^2+12x-4$

138

(1) $x^4+4x^3+10x^2+12x+9$

(2) $x^4+4x^3-2x^2-12x+9$

(3) $9x^4+12x^3-2x^2-4x+1$

$x^3+6x^2+11x+6$

(5) x^4-1

$x^3+6x^2+12x+8$

H139–142 (5–7 min)

139

(1) $x^4 - 4x^2 + 12x - 9$

(2) $x^4 - 4x^3 - 2x^2 + 12x + 9$

(3) $8x^3 - 36x^2 + 54x - 27$

(4) $x^3 + y^3$

(5) $x^3 - y^3$

(6) $x^4 + x^2y^2 + y^4$

140

(1) $2x^3 - 5x^2 + 5x + 4$

(2) $2x^3 - 5x^2 - 7x + 12$

(3) $6x^3 - 17x^2 + 18$

(4) $8x^3 + 1$

(5) $4x^3 - 17x + 12$

(6) $2x^4 - x^3 - 8x^2 + x + 6$

(7) $x^3 - 6x^2 + 12x - 8$

(8) $x^4 - 2x^2y^2 + y^4$

Consider this!

141

(9) $ax + ay + bx + by$
$(ax + bx + ay + by)$

(10) $x^2 + xy - 2y^2$

(11) $x^3 - x - 6$

(12) $3x^3 - 11x - 70$

$2x^2 + 3x - 9$

(13) $x^3 - 4x^2 + x + 6$

$x^3 - 4x^2 - 6x + 5$

$2x^3 - 7x^2 + 12x - 9$

142

Formula Ex.

(1) $x^2 + 10x + 25$

(2) $x^2 + 8x + 16$

(3) $x^2 + 12x + 36$

(4) $x^2 + 4x + 4$

(5) $x^2 + 2x + 1$

(6) 2

(7) $x^2 + 2ax + a^2$

Ex.

(8) $4a^2 + 12ab + 9b^2$

$x^2 + 6xy + 9y^2$

(10) $4x^2 + 4xy + y^2$

(11) $4x^2 + 4x + 1$

(12) $4x^2 + 12x + 9$

(13) $4x^2 + 20x + 25$

(14) $9x^2 + 12x + 4$

(15) $9x^2 + 24x + 16$

H143–146

143

Formula

(1) $x^2 - 2xy + y^2$

(2) $x^2 - 10x + 25$

(3) $x^2 - 8x + 16$

(4) $4x^2 - 12xy + 9y^2$

(5) $4x^2 - 20x + 25$

(6) $9x^2 - 6x + 1$

(7) $9x^4 - 6x^2y^3 + y^6$

(8) $x^6 - 2x^3y^2 + y^4$

(9) $x^2 - 8xy^2 + 16y^4$

(10) $x^4 - 2x^2y + y^2$

(11) $x^4 - 2x^3 + x^2$

(12) $\frac{x^2}{9} - \frac{2xy}{15} + \frac{y^2}{25}$

(13) $\frac{x^2}{9} - \frac{xy}{6} + \frac{y^2}{16}$

(14) $x^2 - \frac{2xy}{3} + \frac{y^2}{9}$

(15) $x^2 - x + \frac{1}{4}$

(16) $x^2 - 2 + \frac{1}{x^2}$

144

Ex.

(1) $x^2 - 6xy + 9y^2$

(2) $4x^2 - 4xy + y^2$

$16x^2 - 24xy + 9y^2$

(4) $x^4 - 2x^2y + y^2$

(5) $9x^4 - 24x^2y^3 + 16y^6$

(6) $\frac{x^2}{9} - \frac{xy}{6} + \frac{y^2}{16}$

$x^2 - \frac{2xy}{3} + \frac{y^2}{9}$

(8) $9x^4 - 2x^2y^3 + \frac{1}{9}y^6$

(9) $9x^2 - 6xy + y^2$

(10) $9x^2 - 6xy + y^2$

(11) $\frac{1}{6}$

(12) $4x^2 + 12xy + 9y^2$

(13) $16x^6 + 24x^3y^2 + 9y^4$

(14) $\frac{x^2}{4} + \frac{xy}{3} + \frac{y^2}{9}$

(15) $9x^2 + x + \frac{1}{36}$

145

Ex.

$-18x^2 + 60x - 50$

$-48x^2 + 72xy - 27y^2$

$75x^2 - 60x + 12$

$-2x^6 - 12x^3y - 18y^2$

(5) $36x^2 + 96x + 64$

(6) $9x^2 - 36xy + 36y^2$

(7) $4x^4 - 32x^2y^2 + 64y^4$

(8) $-18x^2 + 48x - 32$

$-48x^4y^2 + 120x^3y^3 - 75x^2y^4$

(10) $36x^2 - 180x + 225$

(11) $9x^2 - 12xy + 4y^2$

(12) $-\frac{2}{3}a^2 + 2ab - \frac{3}{2}b^2$

(13) $\frac{1}{9}a^2 - \frac{1}{3}ab + \frac{1}{4}b^2$

146

Formula

$x^2 - y^2$

$x^2 - 4y^2$

$4x^2 - 9y^2$

$25x^2 - 36$

(5) $x^6 - 16$

(6) $x^2y^2 - 1$

(7) $x^2 - \frac{4}{9}$

$x^2 - 4$

(9) $9x^2 - 25$

(10) $18x^2 - 50$

(11) $48x^2 - 27$

(12) $-3a^2 + 27x^2$

(13) $-125x^2 + 5$

(14) $-x^2y^2 + 4$

(15) $\frac{2}{9}x^2 - \frac{8}{25}$

(16) $\frac{8}{9}x^2 - \frac{9}{8}$

H147–150 (5–7 min)

147

Formula

(1) $x^2+8x+16$

(2) $9x^2+30x+25$

(3) $9x^2-12xy+4y^2$

(4) $9x^2-1$

(5) x^2-16y^2

(6) $25x^2-4y^2$

(7) $25x^2+20xy+4y^2$

(8) $18x^2+24x+8$

(9) $-2x^2+18$

(10) $-4x^2+20xy-25y^2$

(11) $-3x^2+27y^2$

(12) $2x^2+10x+16$

(13) $14x^2-6xy-4y^2$

(14) $-37y^2+4xy$

Alternative Answer

$(4xy-37y^2)$

(15) $8x^2-16x-9$

148

Formula

(1) $x^2+8x+15$

(2) $x^2+2x-15$

(3) $x^2-2x-15$

(4) $x^2-8x+15$

(5) $x^2+9x+14$

(6) $x^2+2x-24$

(7) $x^2-5x-24$

(8) $x^2-14x+48$

(9) $2x^2-6x-20$

(10) $-3x^2-3x+36$

(11) $-x^2y^2+7xy-10$

(12) $2x^2+10xy-100y^2$

(13) $2x^2-42$

(14) -16

(15) $-2x+1$

(16) $6x$

149

Formula

(1) 31

(2) $6x^2+19x+10$

(3) $3x^2-13x-30$

(4) $6x^2+11x-10$

(5) $8x^2+2xy-15y^2$

(6) $15x^2+x-40$

(7) $-3x^2+22x+16$

(8) $12x^2-23x+10$

(9) $-2x^2+7x+30$

(10) $3x^2+2xy-8y^2$

(11) $8x^2-26xy+15y^2$

(12) $24x^2+2x-70$

(13) $20x^2-52x+24$

(14) $-8x^2-2x+21$

(15) $-18x^2-21x+60$

150

(1) x^2+6x+9

x^2-6x+9

x^2-9

(4) $x^2+3x-28$

$12x^2$ $60x+75$

$18x^2+60x+50$

$2x^2-1x$ 30

(8) $-20x^2+45$

(9) $12x^2-7x-10$

(10) $6x^2-23x+20$

(11) $-30x^2-25x+20$

(12) $12xy$

(13) $2x^2-5x+31$

(14) $-5x$

(15) $-y^2$

151

Ex.

(1) $a(y+z)$

(2) $x(y+z)$

$a(x-y)$

(4) $x(a-b)$

(5) $2(2x-3y)$

(6) $3(2x+y)$

(7) $4(x-2)$

151

Ex.

(8) $4x(x-3)$

(9) $3x(2x-3)$

(10) $xy(x-y)$

(11) $6xy(xy+4)$

(12) $x^2(ax+b)$

(13) $x^3(ax^2+b)$

(14) $3x^2(4x+3)$

(15) $3ax^2(a+2)$

152

(1) $2(x+2)$

(2) $2(x+1)$

(3) $3x(2x+1)$

(4) $x^2(2x+1)$

(5) $a(x-y-z)$

(6) $3x(x-3y+4z)$

(7) $xy(x+y+1)$

(8) $x(x^2-x+1)$

152

Ex.

(9) $-2a(x+3y)$

(10) $-2x(x+4)$

(11) $-4x(a+b)$

(12) $-y(3x-y)$

(13) $-5xy(x-2y)$

(14) $-4x(2y+x)$

(15) $-5x(x-3y+2z)$

153

Ex.

(1) $(x+2)(a+b)$

(2) $(2x-y)(x+y)$

(3) $(a+b)(x+3)$

(4) $(x-2)(3x-5)$

(5) $(x+y)(3a+2)$

(6) $(x+y)(3a+1)$

$(2a-b)(x+1)$

153

(8) $(a-b)(x+y)$

(9) $(x-y)(a-b)$

(10) $(x+y)(2a+b)$

(11) $(a-b)(3x+2y)$

(12) $(a-b)(3x+1)$

(13) $(x-y)(4a-1)$

(14) $(x+y)(1+5a)$

(15) $(x-2y)(6y-5z)$

154

Ex.

(1) $3(x+y)(2a+b)$

(2) $3(x-y)(2a+3b)$

(3) $4(x+y)(a-3b)$

(4) $2(x+3)(2a+3)$

(5) $3(x-3)(x-2)$

(6) $3(x-3)(x+1)$

(7) $2(x+3)(2x-1)$

154

Ex.

(8) $4c(x+y)(2a+3b)$

(9) $3x(x+y)(2a+3b)$

(10) $4x(x+y)(2a+3b)$

(11) $2a(x+y)(a+2b)$

(12) $2a(x-y)(2a-3b)$

(13) $x(x-2y)(4x+y)$

(14) $2a(x-2)(3a-2)$

H155–158 (4–6 min)

155

(1) $3x(x+y)(3a+4b)$

(2) $3xy(x+y)(3a+4b)$

(3) $3x(x+y)(3a^2+4b^2)$

(4) $3x^2(x+y)(3a+4b)$

(5) $3x(x+y)(3ax+4b)$

(6) $3(x+y)(3ax^2+4b)$

(7) $3(x+y)(3ax^2+4)$

(8) $3(x+y)(3ax^2+1)$

156

Formula Ex.

(1) $(x+y)^2$

(2) $(x+3y)^2$

(3) $(x-2y)^2$

(4) $(x+7y)^2$

(5) $(x+4)^2$

(6) $(x-5)^2$

(7) $(x-6)^2$

(8) $(x+10)^2$

155

(9) $5xy(a-b)(2+xy)$

(10) $5xy(a-b)(2y+x)$

(11) $5xy(a-b)(2xy+1)$

(12) $3x(x+1)(2x+y)$

(13) $3x(x+1)(2x+1)$

(14) $2(a+3)(2x+1)$

(15) $x(x-y)(x-1)$

(16) $x^2(x-y)(1-x)$

156

Ex.

(9) $(3x+2y)^2$

(10) $(4x-5y)^2$

(11) $(5x-6y)^2$

(12) $(x+9)^2$

(13) $(2x+3)^2$

(14) $(2x-9)^2$

(15) $(2x+1)^2$

(16) $(4x-1)^2$

H155–158

158

Ex.

1 $2a(3x+5y)^2$

$-5ab(2x-a)^2$

$x(x-5)^2$

$a(x-y)^2$

$3(x-3)^2$

$x^2-2xy+y^2 \quad -(x-y)^2$

$-(a-3x)^2$

158

$4ab(3x+2y)^2$

$2x(a+3b)^2$

$a^3(x-y)^2$

$-3(x+2y)^2$

$5(x-4y)^2$

$3a(2xy+5)^2$

$-(x+y)^2$

$-(2x-y)^2$

157

(If students don't write "non-factorable" for any problems, give the worksheet back to them without marking)

$(x+7)^2$

$(x-8)^2$

non-factorable

$(x-9)^2$

$(2x-3)^2$

$(3x-5)^2$

non-factorable

$\left(3x+\frac{1}{2}\right)^2$

157

$(3x+y)^2$

$(x-1)^2$

$(6x+5y)^2$

$(5x-2y)^2$

$(xy-6)^2$

$(ax+3)^2$

$(3x-1)^2$

$\left(x+\frac{1}{3}\right)^2$

159

Ex.

(1) $(x^2+y^4)^2$

(2) $(x^2+2y^3)^2$

(3) $(x^2+6y^5)^2$

(4) $(x^2+y^2)^2$

(5) $(5x^2+7y)^2$

(6) $(3x^2+1)^2$

(7) $-(3x^2-4)^2$

(8) $(x^2-y^3)^2$

(9) $(2x^3+3y^2)^2$

(10) $2(x^3+y^2)^2$

(11) $-2(x^2-3y^2)^2$

(12) $-5(2x^2-y^3)^2$

(13) $\underline{4}$

(14) $\overline{6x}\quad\underline{3}$

(15) $\boxed{4xy}\ (2x+y)^2$

(16) $\boxed{9}\ (x-3)^2$

160

(1) $x^2(x+1)$

(2) $12a(3x^2+5y^2+7z^3)$

(3) $(2x-y)(x+y)$

(4) $(a+1)(3x+1)$

(5) $2(x+3)(2a+1)$

(6) $3(x-3)(a+1)$

(7) $3(a-2)(x-2)$

(8) $x(a+b)(x-1)$

(9) $(x+2)^2$

(10) $(x-3)^2$

(11) $(2x-y)^2$

(12) $(2x-7y)^2$

(13) $(3x^3-5y^4)^2$

(14) $2(x^3+3y^3)^2$

(15) $-3a(x-4y)^2$

(16) $-(3x+2y)^2$

161

Formula

(1) $(x+y)(x-y)$

(2) $(x+2y)(x-2y)$

(3) $(x+5)(x-5)$

(4) $(2x+5)(2x-5)$

(5) $(3x+5)(3x-5)$

(6) $(4x+5y)(4x-5y)$

(7) $(xy+4)(xy-4)$

(8) $(xy+4a)(xy-4a)$

(9) $(x+7)(x-7)$

(10) $(x+9y)(x-9y)$

(11) $(3x+5y)(3x-5y)$

(12) $(2x+3)(2x-3)$

(13) $(2x+7y)(2x-7y)$

(14) $(1+2x)(1-2x)$

(15) $(xy+2z)(xy-2z)$

(16) $(5xy+7ab)(5xy-7ab)$

162

Ex.

(1) $(3x^2+y)(3x^2-y)$

(2) $(4x^3+5y)(4x^3-5y)$

(3) $(3xy+1)(3xy-1)$

(4) $(3x^2y+11)(3x^2y-11)$

(5) $(x^3+y)(x^3-y)$

(6) $(x+3y^3)(x-3y^3)$

(7) $(4x^3+5y^2)(4x^3-5y^2)$

(8) $(2x+3y^3)(2x-3y^2)$

(9) $(3x^3+4y)(3x^3-4y)$

(10) $(3xy+2z)(3xy-2z)$

(11) $(2x^3+5y^4)(2x^3-5y^4)$

(12) $(3xy^3+4z^3)(3xy^3-4z^3)$

(13) $(4x^3y+5az^3)(4x^3y-5az^3)$

(14) $(7xy^3+11z)(7xy^3-11z)$

(15) $(9x+8yz)(9x-8yz)$

H163–166 (5–7 min)

163

Ex.

(1) $a(x+3y)(x-3y)$

(2) $3(2x+y)(2x-y)$

(3) $a(x+7y)(x-7y)$

(4) $2(x+5)(x-5)$

(5) $3ax(y+3)(y-3)$

(6) $y^2(3x+2)(3x-2)$

(7) $x(xy+x)(xy-x)$

163

(8) $3(x+5)(x-5)$

(9) $2(x+6)(x-6)$

(10) $3(xy+2z)(xy-2z)$

(11) $3x(xy+2z)(xy-2z)$

(12) $ax(x^2+y)(x^2-y)$

(13) $2x(x^2+y)(x^2-y)$

(14) $xy(x+y)(x-y)$

(15) $xyz(x+y)(x-y)$

(16) $xyz(xy+z)(xy-z)$

Mark correct ones when [illegible]

Ex H164 $x+1$ $x+2$

164

Formula Ex.

(1) $(x+2)(x+1)$

(2) $(x+4)(x+2)$

(3) $(x+5)(x+2)$

(4) $(x-3)(x-1)$

(5) $(x-5)(x-3)$

(6) $(x-7)(x-2)$

(7) $(x-6)(x-3)$

164

(8) $(x-3)(x-2)$

(9) $(x-4)(x-2)$

(10) $(x-5)(x-2)$

(11) $(x+5)(x+3)$

(12) $(x+7)(x+2)$

(13) $(x+6)(x+3)$

(14) $(x-8)(x-2)$

(15) $(x+8)(x+2)$

165

Formula Ex.

(1) $(x+7)(x-2)$

(2) $(x+8)(x-2)$

(3) $(x+6)(x-4)$

(4) $(x-6)(x+3)$

(5) $(x-3)(x+1)$

(6) $(x+3)(x-2)$

(7) $(x-5)(x+4)$

165

(8) $(x-7)(x+2)$

(9) $(x-8)(x+2)$

(10) $(x-6)(x+4)$

(11) $(x+6)(x-3)$

(12) $(x+3)(x-1)$

(13) $(x-3)(x+2)$

(14) $x+5\ (x-4)$

(15) $(x+6)(x-5)$

166

(1) $(x+2)(x+1)$

$(x-2)(x-1)$

(3) $(x+2)(x-1)$

(4) $(x-2)(x+1)$

(5) $(x+4)(x+2)$

(6) $(x-4)(x-2)$

(7) $(x+4)(x-2)$

(8) $(x-4)(x+2)$

166

(9) $(x+6)(x+2)$

(10) $(x-6)(x-2)$

(11) $(x+6)(x-2)$

(12) $(x-6)(x+2)$

(13) $(x+4)(x+3)$

(14) $(x-4)(x-3)$

(15) $(x+4)(x-3)$

(16) $(x-4)(x+3)$

H167–170 (5–7 min)

167

(1) $(x+3)(x+1)$

(2) $(x-7)(x-3)$

(3) $(x+5)(x-2)$

(4) $(x-9)(x+2)$

(5) $(x+8)(x-7)$

(6) $(x-9)(x-2)$

(7) $(x-5)(x-4)$

(8) $(x-12)(x+2)$

(9) $(x-7)(x+3)$

(10) $(x-8)(x+5)$

(11) $(x-8)(x-3)$

(12) $(x-6)(x-4)$

(13) $(x-6)(x+5)$

(14) $(x-12)(x-1)$

(15) $(x+7)(x-6)$

(16) $(x-17)(x+5)$

168

(1) $(x+7)(x+4)$

(2) $(x-7)(x+4)$

(3) $(x+7)(x-4)$

(4) $(x+28)(x+1)$

(5) $(x-28)(x-1)$

(6) $(x+28)(x-1)$

(7) $(x-28)(x+1)$

(8) $(x-9)(x+6)$

(9) $(x+9)(x+4)$

(10) $(x+6)^2$

(11) $(x+12)(x+3)$

(12) $(x-18)(x-2)$

(13) $(x+8)(x-3)$

(14) $(x+9)(x-6)$

(15) $(x-12)(x+10)$

(16) $(x+13)(x-12)$

169

(1) $2(x+10)(x+4)$

(2) $3(x-4)(x-1)$

(3) $a(x-6)(x+2)$

(4) $2(x+5)(x-2)$

(5) $-2(x+2)(x-1)$

(6) $-3a(x-4)(x+1)$

(7) $-2(x-11)(x-2)$

(8) $2(x-8)(x+5)$

(9) $3(x-8)(x-3)$

(10) $-2(x-6)(x+5)$

(11) $2(x-6)(x+2)$

(12) $2x(x+3)(x-1)$

(13) $-3(x+6)(x-2)$

(14) $-2(x-12)(x+1)$

(15) $-(x+7)(x-4)$

170

(1) $(2x+5y)(2x-5y)$

(2) $(4x^3+7ay^2)(4x^3-7ay^2)$

(3) $3ax(xy+3z)(xy-3z)$

(4) $y^2(3x+4)(3x-4)$

(5) $(x-5)(x-3)$

(6) $(x-8)(x+3)$

(7) $(x+9)(x-4)$

(8) $(x+10)(x+3)$

(9) $(x-4)^2$

(10) $(x-16)(x+1)$

(11) $(x+12)(x+3)$

(12) $2(x-10)(x-4)$

(13) $a(x+6)(x+2)$

(14) $-3a(x+5)(x-2)$

(15) $2x(x+2)(x-1)$

(16) $-2(x-12)(x-1)$

H171–175 (5–7 min)

Mark correct even when the order of terms is reversed.
Ex. H171 2 (3) $(3x+7)(x+1)$

171

1

(1) 3

(2) 3

(3) 5

(4) 7

Ex.

2

(1) $(x+1)(3x+5)$

(2) $(x+5)(3x+1)$

(3) $(x+1)(3x+7)$

(4) $(x+3)(2x+1)$

(5) $(x+1)(2x+3)$

(6) $(x-1)(2x-3)$

(7) $(x-1)(2x+3)$

(8) $(x+1)(2x-3)$

(9) $(x-3)(2x+1)$

(10) $(x-3)(2x-1)$

172

(1) $(x+1)(2x+5)$

(2) $(x-1)(2x-5)$

(3) $(x-1)(2x+5)$

(4) $(x+1)(2x-5)$

(5) $(x+5)(2x+1)$

(6) $(x-5)(2x-1)$

(7) $(x-5)(2x+1)$

(8) $(x+5)(2x-1)$

(9) $(x+1)(5x+2)$

(10) $(x-1)(5x-2)$

(11) $(x-1)(5x+2)$

(12) $(x+1)(5x-2)$

(13) $(x+1)(5x+7)$

(14) $(x+1)(5x-7)$

(15) $(x-7)(5x-1)$

(16) $(x-7)(5x+1)$

173

(1) $(x+1)(3x+4$

(2) $(x-1)(3x-4)$

(3) $(x+4)(3x-1$

(4) $(x-4)(3x+1)$

(5) $x+2\ \ 3x+2$

(6) $(x-2)(3x-2)$

(7) $(x-2)(3x+2)$

(8) $(x+2)(3x-2)$

(9) $(x+1)(5x+4)$

(10) $(x+2)(5x+2)$

(11) $(x-2)(5x-2)$

(12) $(x+4)(5x+1)$

(13) $(x-4)(5x-1)$

(14) $(x-2)(5x+2)$

(15) $(x+2)(5x-2)$

(16) $(x+1)(5x-4)$

174

$(x+1)(5x+6)$

$(x+2)(5x+3)$

$(x+3)(5x+2)$

$(x+6)(5x+1)$

$(x+2)(5x-3)$

(6) $(x-2)(5x+3)$

(7) $(x-6)(5x+1)$

(8) $(x-6)(5x-1)$

(9) $(x-1)(5x-6)$

(10) $(x-2)(5x-3)$

(11) $(x-3)(5x-2)$

(12) $(x-3)(5x+2)$

(13) $(x+3)(5x-2)$

(14) $(x-1)(5x+6)$

(15) $(x+1)(5x-6)$

(16) $(x+6)(5x-1)$

175

(1) $(x-1)(4x-3)$

(2) $(x+3)(4x-1)$

(3) $(x-3)(4x+1)$

(4) $(x+3\ \ 4x+1$

(5) $(2x-3)(2x-1)$

(6) $(2x+3)(2x-1)$

(7) $(2x-3)(2x+1)$

(8) $(x+1)(6x+5)$

(9) $(x+5)(6x+1)$

(10) $(2x-1)(3x+5)$

(11) $(2x+5)(3x-1)$

(12) $(x+5)(6x-1)$

(13) $(2x+1)(3x+5)$

(14) $(2x+1)(3x-5)$

176

(1) $(2x+3)(3x+5)$

(2) $(2x-3)(3x-5)$

(3) $(2x-3)(3x+5)$

(4) $(2x+3)(3x-5)$

(5) $(2x-3)(3x+7)$

(6) $(2x+3)(3x-7)$

(7) $(2x+3)(4x-5)$

(8) $(2x-3)(4x+5)$

(9) $(2x+5)(4x+3)$

(10) $(2x-5)(4x-3)$

(11) $(2x-5)(4x+3)$

12 $(2x+5)(4x-3)$

177

(1) $(x+1)(2x+7)$

(2) $(x-2)(2x-3)$

(3) $(x+2)(3x-4)$

(4) $(x-2)(5x+7)$

(5) $(x+2)(4x-5)$

(6) $(2x+3)(3x-4)$

(7) $(2x+3)(4x-7)$

(8) $(x-2)(2x+5)$

(9) $(x-3)(3x+2)$

(10) $(x-1)(4x+7)$

(11) $(x-2)(5x-4)$

(12) $(2x+5)(3x-4)$

(13) $(2x+3)(4x-9)$

14) $(2x-3)(5x+7)$

178

(1) $(x-5)(2x+3)$

(2) $(x+2)(3x-5)$

(3) $(x-2)(5x+6)$

(4) $(x+3)(7x+4)$

(5) $(2x-5)(4x+7)$

(6) $(2x-3)(6x+5)$

(7) $(3x-2)(4x+7)$

Ex.

(8) $(x+2y)(3x+y)$

(9) $(x+4y)(2x+y)$

(10) $(x+2y)(3x-4y)$

(11) $(x-3y)(3x+2y)$

(12) $(x-4y)(2x+3y)$

(13) $(x+2y)(3x-5y)$

14) $(x-2y)(5x-7y)$

179

Ex.

(1) $2(x+3)(2x+1)$

(2) $2(x-1)(2x-3)$

(3) $3(x+1)(2x-5)$

(4) $3(x+5)(2x+1)$

(5) $2(x+2)(3x+2)$

(6) $2(2x-5y)(3x+2y)$

(7) $x(x-3)(5x-2)$

(8) $a(x-9)(x+2)$

(9) $-2a(2x+5)(2x-1)$

(10) $2a(x+1)^2$

(11) $3x(2x-1)^2$

(12) $2a(2x-3)(6x+5)$

180

1 $2(x-3)^2$

(2) $3(x-4)^2$

(3) $a(x-4)(x+2)$

(4) $2(x-2)(x+1)$

(5) $-3(x+1)(2x-3)$

(6) $-2(x-1)(2x-3)$

(7) $2a(x+5)(x-2)$

(8) $2(2x+y)^2$

(9) $2a(3x-1)^2$

(10) $x(x-12y)(x-2y)$

(11) $a(x-2)(2x+1)$

(12) $a(3x-2)(4x+7)$

181

Ex.

(1) $(x+y)(3x+3y+5)$

(2) $(x+y)(5x+5y-2)$

Ex.

(3) $(x+y)(3+7x+7y)$

(4) $(x+y)(5-3x-3y)$

181

(5) $(x+y)(3x+3y-7)$

(6) $(x+y)(ax+ay-b)$

(7) $(x-y)(x-y-a)$

(8) $(x-y)(a+bx-by)$

(9) $(2x-y)(x^2+2xy-y^2)$

(10) $(2x+y)(1-2xy-y^2)$

182

Ex.

(1) $y(x-y)(4x-3y)$

(2) $y(x+y)(x-2y)$

(3) $x(x-y)(3x-4y)$

(4) $x(x+y)(2x+3y)$

(5) $y(x-3y)(4x-3y)$

182

Ex.

(6) $8y(x+4y)$

(7) $x^2(x-2y)$

(8) $xy(x+y)$

(9) $-9y(x+3y)$

(10) $xy^3(x-y)$

183

Ex.

(1) $9(x-3y)(x-y)$

(2) $4(x-2y)(x+y)$

(3) $2(x-2y)(2x-3y)$

(4) $-2(x-2y)(x+y)$

183

(5) $-6(x-3y)(x+y)$

(6) $-9(3x-y)(x-y)$

Alternative Answer

$9(3x-y)(y-x)$

(7) $3(x-3y)(2x-y)$

(8) $6y(x-2y)(2x-3y)$

(9) $2(x-2y)(3x-7y)$

184

Ex.

(1) $a(x+y)(a+x)(a-x)$

(2) $2(x-3y)(x+2)(x-2)$

(3) $3(2x+y)(x+3)(x-3)$

(4) $3(3x-y)(1+2x)(1-2x)$

(5) $(2x+y)(xy+4a)(xy-4a$

184

Ex.

(6) $x(2x+y)(x+y)^2$

(7) $x(x+y)(x+2y)^2$

(8) $x(3x-y)(3x-2y)^2$

(9) $2x(4x-y)(2x-y)^2$

185

Ex.

(1) $(x-y)(x+y)(2x-y)$

(2) $(x-2y)(x+y)(3x-2y)$

(3) $(x+2y)(2x+3y)(2x+y)$

(4) $3(x-4y)(x-5y)(x+y)$

(5) $(x-2y)(4x+5y)(4x-5y)$

(6) $x(2x-3y)(x-3y)^2$

(7) $x(x+y)^2(x+2y)(x-y)$

(8) $2(x+y)^2(x-y)(2x+y)$

186

(1) $x[(a+b)+(a+c)]$
$x(2a+b+c)$

(2) $3x(a+2b)$

(3) $2x(a+b+c)$

(4) $2(a+b)(3x-2y)$

(5) $(a+b)(x-5)(x+2)$

(6) $(a-b)(x-3)(2x+1)$

(7) $(2a+3b)(x-1)(2x-3)$

(8) $2(x+4y)(x-4y)(x+2y)$

(9) $-3x(x+3y)(x-y)(4x+3y)$
Alternative Answer
$[\,3x(x+3y)(y-x)(3y+4x)\,]$

187

Ex.

(1) $(x-y+z)(x-y-z)$

(2) $(x+y+3)(x+y-3)$

(3) $[x+(y+z)][x-(y+z)]$
$(x+y+z)(x-y-z)$

(4) $(x+y-z)(x-y+z)$

(5) $(x-4y+2z)(x-4y-2z)$

Ex.

(6) $8(x+2y)(x-4y)$

(7) $4(x-y)(x-2y)$

(8) $12(x+y)(2x-3y)$

(9) $3(3x-1)(x-3)$

188

Ex.

(1) $(a-b+c-d)(a-b-c+d)$

(2) $(2x+y-z)(y+z)$

(3) $(5x+3)(x+1)$

(4) $4(4x-1)(x+3)$

(5) $(2x-y+5)(2x-y-5)$

(6) $3(5x-3y)(x+y)$

(7) $-4(x+y)(x-2y)$
$[\,4(y+x)(2y-x)\,]$

(8) $-4y(x-2y)$

(9) $4(2x-3)(x+2)$

189

(1) $(a^2-2ab+b^2)-9x^2$
$(a-b)^2-9x^2$
$(a-b+3x)(a-b-3x)$

(2) $(x+y+z)(x+y-z)$

(3) $(x+a+b)(x-a-b)$

(4) $(x+y+1)(x-y-1)$

(5) $(2x+2y+1)(2x-2y-1)$

(6) $(2x-y+1)(2x-y-1)$

(7) $(3x+3y+1)(3x-3y-1)$

(8) $(6x+2y+3z)(4x-2y-3z)$

(9) $-4(2x+y-1)(x-y-4)$

190

(1) $(x+y)(3x+3y-4)$

(2) $xy(x-y)$

(3) $9(3x-y)(x-y)$

(4) $a(x+3y)(a+x)(a-x)$

(5) $x(2x+3y)(x+3y)^2$

(6) $(x+y)(x-y)(2x+y)$

(7) $(a-b)(x-6)(x+2)$

(8) $4(2a-b)(a+b)$

(9) $-4(2x+y-2)(x-y-2)$

(10) $(x+2y+1)(x-2y-1)$

191

例

(1) $(x+y+2)^2$

(2) $(x+y-3)^2$

(3) $(x+y+4)^2$

(4) $(x+y-5)^2$

(5) $(x+y-1)^2$

(6) $(x+y-4a)^2$

(7) $(x+y-5a)^2$

(8) $(x+2y+z)^2$

(9) $(x+2y-2z)^2$

(10) $(3x-2y+4z)^2$

192

例

(1) $(x+4a+4b)^2$

(2) $(x-3a-3b)^2$

(3) $(x+a+b)^2$

(4) $(x-a-b)^2$

(5) $(x-5y-5z)^2$

(6) $(4x+a+3b)^2$

(7) $(x+4y+5a)^2$

(8) $(x+y+2a)^2$

(9) $(x-y)^2$

(10) $(5x+a+2b)^2$

193

(1) $(x+4y)^2$

(2) $(x-4y)^2$

(3) $(3x+2y)^2$

(4) $(3x-2y)^2$

(5) $(2x-5y)^2$

Ex.

(6) $4(2x+3y)^2$

(7) $4(3x+5y)^2$

(8) $9(x-4y)^2$

(9) $16(x+5y)^2$

194

Ex.

(1) $(x+y-6)(x+y+1)$

(2) $(x+y+6)(x+y-3)$

(3) $(x+y-3)(x+y-1)$

(4) $(x+y-4)(x+y-2)$

(5) $(x+y-4)(x+y+3)$

(6) $(x-y-6z)(x-y+z)$

(7) $(x-y+5z)(x-y-3z)$

(8) $(x-y-5z)(x-y-2z)$

(9) $(x-2y-6z)(x-2y+3z)$

(10) $(3x-y-5z)(3x-y-4z)$

195

(1) $(5x+y)(3x+y)$

(2) $(8x-y)(x-y)$

(3) $(7x+y)(x+y)$

(4) $(x+6y)(x+5y)$

(5) $(x+2y)(x-5y)$

Ex.

(6) $(6x+5y)(3x+2y)$

(7) $(6x+5y)(4x+3y)$

(8) $2(5x+8y)(x+y)$

(9) $3(4x+9y)(x+2y)$

196

Ex.

(1) $[(x+y)+1][2(x+y)+3]$
$(x+y+1)(2x+2y+3)$

(2) $(x+y+5)(2x+2y-1)$

(3) $(x+y+2)(2x+2y-3)$

(4) $(x+y-4)(3x+3y-1)$

(5) $(x+y-2)(3x+3y+2)$

(6) $(x+y-2)(5x+5y+3)$

(7) $(x+y-3)(5x+5y-2)$

(8) $(2x+2y-3)(2x+2y-1)$

(9) $(x-y+5)(3x-3y-1)$

(10) $(2x-2y+1)(3x-3y-5)$

197	198
(1) $(x+y+z)(2x+2y+3z)$	Ex. (1) $(a^2+b^2)(a+b)(a-b)$
(2) $(x+y+5z)(2x+2y-z)$	(2) $(x^2+4)(x+2)(x-2)$
(3) $(x+y+2z)(2x+2y-3z)$	(3) $(4x^2+y^2)(2x+y)(2x-y)$
(4) $(x+y-4z)(3x+3y-z)$	(4) $(x^4+y^4)(x^2+y^2)(x+y)(x-y)$
(5) $(x+y-2z)(3x+3y+2z)$	(5) $(x^4y^4+z^4)(x^2y^2+z^2)(xy+z)(xy-z)$
(6) $(2x+y)(7x+2y)$	Ex. (6) $(x+3)(x-3)(x^2+4)$
(7) $(x-2y)(3x+2y)$	(7) $(x^2+9)(x+1)(x-1)$
(8) $(x-y)(7x+8y)$	(8) $(x^2+7)(x+2)(x-2)$
(9) $(3x+2y)(7x+9y)$	(9) $(x+3)(x-3)(x^2+6)$
(10) $(x-2y)(7x-3y)$	(10) $(x+2y)(x-2y)(x^2+2y^2)$

199	200
Ex. (1) $(a+b)^2(a-b)^2$	(1) $(3x+2y)^2$
(2) $(x+2)^2(x-2)^2$	(2) $(5x-12y)^2$
(3) $(x+1)^3(x-1)^3$	(3) $(x-y-z)^2$
(4) $(x+3)^3(x-3)^3$	(4) $(x-y)^3$
(5) $x(x+1)^2(x-1)^2$	(5) $(x+y-6)(x+y+3)$
(6) $(x^2+4y^2)(x+2y)(x-2y)$	(6) $(5x-2y)(3x-2y)$
(7) $(x+2)(x-2)(x^2+3)$	(7) $(x+y-5)(2x+2y+1)$
(8) $(x+2y)^3(x-2y)^3$	(8) $(x+3y)(7x+6y)$
(9) $x(x^2+1)(x+1)(x-1)$	(9) $(x^2+9)(x+3)(x-3)$
(10) $(x+3)(x-3)(x+2)(x-2)$	(10) $(x+3)(x-3)(x^2+1)$